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Lessons from America.

IT is notoriously difficult to obtain a proper perspective in American affairs. Britons, on returning from a visit across the Atlantic, almost invariably show traces of having become infected with the bacillus of optimism, which would appear to be a natural product of the New World, as well as an assiduously cultivated growth.

While it was evident to those who listened to the short speeches made by Lieut.-Col. W. A. VIGNOLES and Mr. H. T. YOUNG at the luncheon held last week to celebrate their homecoming that neither had escaped the usual fate of the modern Columbus, it says much for their self-restraint that in the main they confined their remarks to general impressions, they having no doubt decided to allow their solid and more detailed experiences to undergo a mental settling process before permitting them to be drawn off for our more serious edification.

Yet from the impressionist sketch which our travellers placed before us (which we report on a later page) there is much that we can with profit seize upon at once. The most obvious is the importance attached by electricity supply undertakings in the States to the idea of service to the consumer. The second is the jettisoning of the old economic idea that demand creates supply; it is the supply which there deliberately—and as a chief part of its duties—creates the demand. The cost of giving such service must be reckoned in large sums, but the cost per kWh may, in practice, be regarded as a minus quantity, since its effect is to spread not only its own cost, but other standing charges as well, over a far larger output than would otherwise be the case. Electricity in the U.S.A. cannot be called expensive, bearing in mind three things: (1) the lower value of money; (2) consumers can generally afford to pay more; and (3) (as important as any) consumers *will* pay more than they are prepared to do in Europe.

Electrical development in America appears to have been considerably assisted by the facility with which capital can be raised, largely due to the holding company system to which Lieut.-Col. VIGNOLES referred.

American engineers have informed us that the success of this system is due to the custom of allowing to the local operating companies as much initiative as is consistent with the carrying out of a common policy decided upon by their chiefs in consultation.

No tale of American electrical enterprise would be complete without a reference to the National Electric Light Association, which, in addition to carrying out publicity and propaganda, compiles most valuable data and statistics on electrical matters. There appear to us to be two causes for its success: first, practically all undertakings are members, and it can therefore spend many times the amount on publicity that E.D.A. can; secondly, American business is not handicapped in every way, as ours is, by the prevalence of the "hush-hush" policy, and technical information is freely exchanged between undertakings. We were glad to notice the emphasis laid by Mr. YOUNG on the last point.

It is often said that conditions in America are not comparable to those obtaining here. That there are great differences can readily be seen; but points of similarity can be even more readily discerned, if we look for them.

In addition to the gain from a broadening of outlook by a visit to the U.S.A. and from a study of such foreign methods as can be followed with profit here, we believe that the spirit of optimism which visitors bring back with them (and, we think, never quite lose) is a valuable import. Optimism may at the time of its manifestation be no more justified than pessimism, but it can often move mountains, whereas the other attitude of mind never moved anything.

We should like to make it clear that we certainly do not advocate a mere copying of American methods; many of these would not bear transplanting, and in some points British practice is, in our view, quite definitely ahead. We do, however, commend the tendency apparent lately of sending the engineers of our large supply undertakings to America on visits of exploration. We feel confident that the expenses of the tours will pay very handsome dividends.

Export Volumes and Values.

UPON the face of things our overseas electrical trade position does not appear to be a satisfactory one. During the first six months of the current year, taking values alone into consideration, while our exports have only just about been maintained at the 1929 level, imports have risen by 28 per cent. Although proportionally large, the rise in re-exports does not alter the position.

While we will not pretend that everything is as it should be, we believe that these values are not an absolutely reliable indication of the real state of affairs. Unfortunately so far as electrical goods and apparatus are concerned, only the values are given in the Board of Trade returns (with one or two negligible exceptions). In the case of electrical machinery, however, both weights and values are given. As machinery forms a substantial part of the trade, we shall not be accused of reasoning from the particular to the general if we draw one or two inferences from the figures given in the returns. During the first half of this year, while the weight of electrical machinery exported rose by 6.4 per cent., the total value rose by only 1.2 per cent. In June, as we show in our monthly review elswhere in this issue, the weight rose by 12 per cent. and the value fell by 2.7 per cent. On the other hand, the statistics show that the imports of electrical machinery from January to June declined in weight by 7 per cent., although the value rose by 10 per cent. Attention may be drawn to the great difference in value per unit weight between the machinery exports and imports. In the case of the former, the value per ton declined from £162 to £154 (about 5 per cent.), while the value per ton of imported machinery rose from £254 to £300 (18 per cent.). It is apparent from this substantial difference in values that imports are of a lighter nature than exports.

If machinery is typical of the whole of our overseas electrical trade, it may pardonably be inferred that, while British prices are falling, foreign ones are rising, which means that our competitive ability is improving. An indication of this was given in the D.O.T. report on Belgium, which was reviewed in our last issue.

It may be said, of course, that prices have become unremunerative, but, unless the export trade is done at an absolute loss, there remains the fact that it provides much-needed work, and provides a greater spread-over for overhead charges. A rise in foreign prices also mitigates competition in the home market, for very few people will buy foreign goods unless their price is substantially below that of similar British products.

For these reasons, while we know that matters might be a great deal better, we are inclined to think that there is a gleam of hope in the situation.

The Bristol Undertaking and its Chief.

THE supply from Portishead station has never been formally inaugurated, but the civic visit last week, of which an account is given on another page, may be regarded as a kind of official baptism.

As we fully described the station in our issues of March 14th and 21st, we need not deal with its technical aspects now. To many the most sympathetic part of the proceedings was the reference to the construction of the station as the crown of Mr. H. FARADAY PROCTOR'S long career. Surely it is unique—and equally surely fortunate—for an undertaking to have been constructed under the supervision of and then managed for nearly 40 years by the same engineer.

A striking picture of the field of electrical history covered in this period is conveyed by a comparison of the largest generating sets then and now, 52 kW and 50,000 kW.

Mr. Proctor's loyalty to Bristol is understandable. Bristol is a town favoured as few large towns are; the largest industrial town of the south-west, it is situated in wholly-desirable natural surroundings; it has a noble past and its future, symbolised by Portishead station, will be no less great. It has been said that happy is the place that has no history; yet Bristol has its history and is happy, because, to use a phrase of some local significance, *spiritus intus alit*.

Partly because of this, but also in still larger measure owing to the personality of the "chief," the staff of Bristol Corporation Electricity Department—both technical and other ranks—probably contains a larger proportion of men with upwards of a quarter-century of service than any other undertaking. These will have strongly approved of the tributes paid to Mr. FARADAY PROCTOR, which will no less sincerely be endorsed by those others who have at one time served under his leadership, whether they be in the homeland, or in Canada, India, or South America, as we know some of them are. With them we desire to associate ourselves. We noted with regret, as a mark of the passage of years, that Mr. FARADAY PROCTOR resigned last June from the treasurership of the I.M.E.A., a post he had held for so many years; now, we learn, he will shortly retire from the active pursuit of his profession. We hope he will remain in harness at least long enough to supervise the arrangements made in Bristol for the suitable commemoration of the work of his great relative.

The Poultry Congress.

FULL advantage was taken of the World's Poultry Congress which was to be opened last Tuesday at the Crystal Palace to demonstrate the practical utility of electricity to the poultry farmer, and a large number of electrically-heated incubators of all sizes was on view. A constant automatically-controlled temperature in an incubator is essential to success in large-scale egg production, and, if the poultry farmer will take advantage of the opportunity offered by electricity, he should be able to secure to himself a share of the large amount now paid for eggs that are unnecessarily imported.

The I.E.C. Plenary Meeting.

Denmark—Sweden—Norway: June 27th to July 9th.

By OUR SPECIAL COMMISSIONER.

No. 1.—*A general account of the tour, places visited, and social events, prior to the opening session of the technical meeting.*

THE seventh plenary meeting of the International Electrotechnical Commission achieved this year the remarkable feat of meeting in the capitals of three different countries in the short space of a fortnight.

Fig. 1.—Copenhagen Town Hall.

The opening session was timed to take place in Copenhagen on Friday, June 27th, at 11 a.m., and it drew a larger number than usual of delegates from various parts of the world.

To some of us the weather was particularly kind, although it is rumoured from one source that the North Sea was not on its best behaviour all the time. For those who had previously been in Berlin the backwash of the World Power Conference, and other matters arranged to take place in Copenhagen at the same time, provided the Berlin-Copenhagen line with a super peak load which brought all the breakers out; in fact, it is not yet known how all the delegates got there, and it is even hinted that some of them did not. The roll call at Stockholm proved, however, that they were all there when work was to be done.

Denmark.

The Municipality of Copenhagen very kindly placed the Festival Hall of the City Hall (fig. 1) at the disposal of the Commission, and the visitors were welcomed to the city by Mr. Bulow on behalf of the Municipality of Copenhagen, who pointed out in his speech that, although the Commission was scarcely thirty years old, it could look back upon tremendous developments in electrotechnics during that period.

Professor P. O. Pedersen, president of the Danish Electrotechnical Committee of the I.E.C., extended his Committee's welcome to the guests in a short and very interesting speech, in which he showed what hesitations they had had in inviting the guests to Denmark where there was little to show them, as compared with the enormous resources of the United States and the happy harmony of Italy in combining the masterpieces of the past with those of the present. In his short historical review of electrotechnics, his reference to the discovery of the magnetic needle by Hans Christian Oersted was provided with an element of intimacy, as he showed the original needle with which the discovery was made.

The Danish Minister of Foreign Affairs, Mr. P. Munch, associated himself with the previous speakers on behalf of the Danish Government, and was followed by Mr. S. Norberg, vice-president of the Swedish National Committee, and Mr. C. Bruun, president of the Norwegian National Committee.

To Professor Feldmann, president of the I.E.C., fell the task of replying to the previous speakers, and this difficult task was carried out briefly and gracefully, no point being forgotten.

After the luncheon interval various visits were made to places of interest in and around Copenhagen. Very fittingly, one of the visits was to the statue erected in the memory of Oersted, upon which a wreath was placed on behalf of the I.E.C.

In the evening an official dinner was offered to the delegates by the Danish Electrotechnical Committee, which, considering the very short time that it had at its disposal for entertaining the visitors, did things very well and left a feeling of regret that modern life did not permit of more leisurely procedure on such occasions.

Sweden.

The departure for Stockholm took place at 7.50 a.m. the following morning, and the kindness of the State Railways of Denmark and Sweden in providing special trains for the conveyance of the visitors was highly appreciated.

Helsingor, the port of departure of the ferry which connects that town with Halsingborg, on the Swedish side at the narrowest part of the Oresund, a bare three miles wide, was reached at 9 a.m. The special I.E.C. train left at about 9.20 a.m., and proceeded along the Swedish coast to Laholm, where motor coaches were provided for the trip to Karseforsen to visit the power station of the South Swedish Power Company, which offered the guests luncheon in the main lobby of the power house. Incidentally, part of the energy produced in this

Fig. 2.—Parliament House, Stockholm.

station is transmitted to Denmark by 50,000-V cables under the Straits.

The journey continued at about 2.30 p.m., the train passing Gothenburg, the second most important town of Sweden. Shortly after leaving Gothenburg a halt was made at Trollhättan; during this stop short visits were made to the Trollhättan station, capacity 120,000 kW, and to the Lilla Edet station, having a capacity of

22,500 kW and containing what is claimed to be the largest water wheel in the world.

The clerk of the weather had not been too kind during these visits, but the Royal Board of Waterfalls made ample amends for his conduct in the way the guests were received and entertained at a dinner given by the Board at the Stadshotelet at Trollhättan in the evening.

Fig. 3.—The I.E.C. Council outside Bristol Hotel, Oslo.

Shortly before 11.30 p.m. a tired, but interested, party embarked on two special trains bound for Stockholm, which was reached at 11 o'clock on Sunday morning after a short stop for breakfast *en route*.

The next three hours were occupied by the delegates in sorting themselves out in the various hotels, where arrangements had been previously made for them. This was perhaps the first intimate touch with the work of the Swedish, whose organising powers must have been hard taxed to find accommodation for something of the order of 400 guests in hotels within easy reach of the building where they were eventually to meet. They must be complimented on their accomplishment, and even the habitual grumbler was hard pressed for an excuse to start off.

A number of delegates and a comparatively large number of ladies gathered at 2 o'clock outside the Riksdagshuset (Parliament House, fig. 2) to enjoy a trip round Stockholm before the work of the Advisory Committees started in earnest (real earnest) the following morning. The trip included the City Hall, completed as recently as 1923, situated on the banks of Lake Malaren. It is a monumental edifice with magnificent halls, of a very distinctive type of architecture, and is considered to be the most artistic modern building in Europe, a claim which a subsequent function proved not to be exaggerated. A pause at Fjallgatan provided the visitors with an opportunity of appreciating Max Nordau's description of the city and district: "A bit of a Scottish lake district, a bit of the Neapolitan seashore, some of the Hyeres islands, some rocky protuberances from the Urals, a section of a Canadian pine forest, and a few quarters of Paris—all spread out in and around a bay of the Baltic Sea."

Opening Meeting at Stockholm.

Practically speaking, the whole of the magnificent building of the Riksdagshuset (the Swedish Parliament, fig. 2) was placed at the disposal of the I.E.C. for the meetings of its nineteen advisory committees, many of which sat simultaneously. Information and travelling bureaux were provided, even such modern refinements as a bank and a complete post office were to be found within the building for the convenience of the delegates.

The meeting was opened punctually at 10 o'clock by Mr. A. F. Enstrom, president of the Swedish National Committee, who very briefly reviewed the progress made by the Commission since the memorable meeting in St. Louis in 1904. The Stockholm meeting, he pointed out, had a very full agenda, so much so in fact that the opportunities for social intercourse would be few, as compared with previous meetings. He expressed the hope that the work in hand would achieve successful results and that nobody would take the attitude of the Irishman who, after his first aeroplane trip, thanked the pilot for the two trips. "Why," said the pilot, "there was only one trip." "No," said the Irishman, "there were two: my first and my last."

Professor Feldmann recalled the auspicious "send off" the Commission had received in Copenhagen, and pointed out that the serious part of the trip was now being entered into. This seventh plenary meeting was the most numerously attended of any of the I.E.C. meetings, but the increase brought difficulties of its own, difficulties which, for the most part, fell upon the hosts. He appealed to the delegates to keep in the foreground their most important aim, that of completing the work in hand, although this would mean being ready to make sacrifices for the sake of general agreement, and in a few words clearly defined the standing of the Commission. "We may congratulate ourselves that every one of our members is, or should be, a worker in one Advisory Committee or another, and so it must always be, or we might become a Congress instead of a representative Committee as we are."

"We have quality, authority, and immense goodwill. With these attributes the I.E.C. can accomplish what no Congress is capable of doing. Let us guard jealously the splendid position which we have attained. It is second to none in the limited field in which our activities lie."

The meeting then adjourned, and a photograph of the delegates was taken at the entrance to the Parliament House, after which the Advisory Committees immediately set to work.

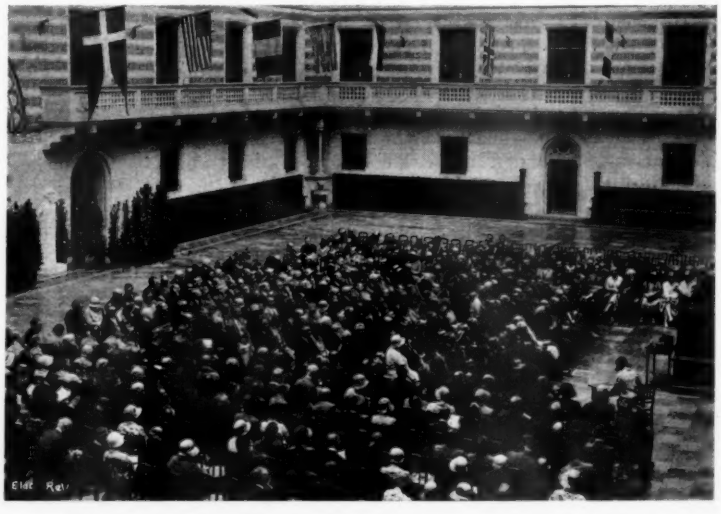


Fig. 4.—Opening Session in the Town Hall, Copenhagen.

The ladies accompanying the foreign delegates returned immediately after the photograph to the hall, where they were addressed by Mr. J. S. Edstrom, vice-president of the Swedish National Committee, and the ladies of that Committee were introduced to them.

Talking Pictures.—IV.*

The principles of recording and reproduction, with comments on the respective features and advantages of the "Vitaphone" (disk) and "Movietone" (film) systems, both recognised to be among the leading ones in use to-day.

By C. M. R. BALBI, A.M.I.E.E., A.C.G.I.

The "Movietone" System.

The "Movietone" sound-film system makes use of a separate recording machine synchronised with the camera, and the sound record is later printed alongside

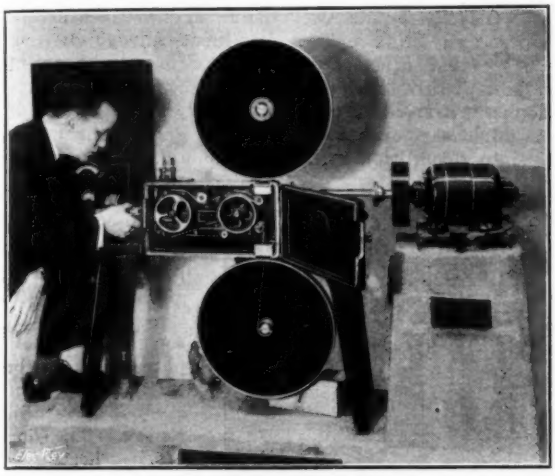


Fig. 29.—Studio Recorder; Exposure Chamber Door Open.

the picture on the finished positive. When the positive is made the prints are displaced, so that the sound is advanced over the corresponding picture; this is in order that the sound may be projected at a point of continuous film motion below the picture gate, for, as is well known, each picture is fed up to the lens in a jerk during the interval that the shutter obscures the image on the screen, while the picture is practically stationary while it is being shown on the screen.

Fig. 29 shows a studio recording machine with the door of the exposure chamber open. In this machine the film travels at 90 feet per minute, and the sound track is made at the edge away from the observer. The line of light, the image of the valve, overruns the perforations by 6 mils, extending towards the centre of the film 122 mils inside the perforation line. The right-hand sprocket serves to draw film from the feed magazine above and to feed it to the take-up magazine below; this sprocket is driven from the motor shaft through a worm and worm-wheel. The left-hand sprocket engages 20 perforations and is driven through a mechanical filter from a worm and worm-wheel similar to that driving the feed sprocket. The mechanical filter enforces uniform angular velocity on the left-hand sprocket, which carries the film past the line of exposure with the aid of a flywheel which holds the angular velocity constant to one-tenth of one per cent., despite the imperfection of the driving gears.

To choose the contrast to which the negative sound record is to be developed, let the machine be run to expose film to light through the unmodulated valve for several values of the lamp current. Develop the film and measure the densities due to the various values of lamp

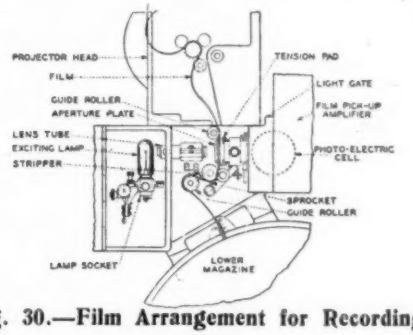


Fig. 30.—Film Arrangement for Recording.

current. Select, by interpolation if necessary on the Hurter & Driffield curve, the lamp current which corresponds to half over-exposure. With that current through the lamp the machine is ready to make a sound record. As has been previously stated, a separate sound film is taken from the actual picture film. This facilitates any cuts in the sound reproduction that may be required in editing the film. The picture negative and the sound negative are displaced by 14½ inches when they are printed together on the positive, so as to make allowance for the seat of action between the light projection and the sound reproduction to take place at that distance apart, for the reasons that have been explained.

Fig. 30 shows the film in position for recording in

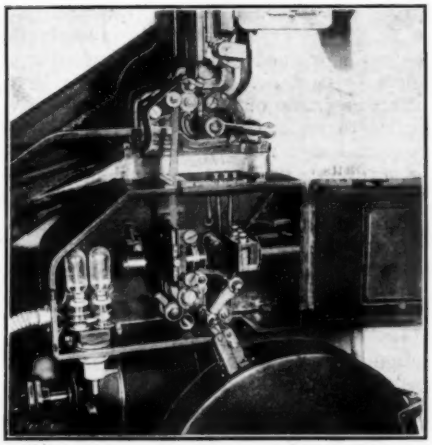


Fig. 31.—B.A. Co.'s Projector and Sound Head.

Fig. 32.—B.A. Co.'s Amplifier.

* For Parts I, II, and III see ELEC. REV., June 20th, July 4th, and 11th, 1930.

relation to its associated equipment. The action of the photo-electric cell has already been described, and from then onwards the details of the equipment are very similar to those of the " Vitaphone " system.

On account of the displacement between the relative positions of the sound and mute films it is not possible to cut a piece of film out and joint it up again, because over the 14½ inches of film the new and the old would not coincide unless the cut was made in the shape of an L, the height of which was 14½, which is not a practical method from a film operator's point of view. The cuts have therefore to be made on the negatives, so that the positives shall be of a continuous length. Should a positive sound film break, the ends cannot be joined up in the old way, for the same reason, but the difficulty is got over by having a spare positive film from which a duplicate of the missing piece can be cut, plus a small overlap at each end, so that in appearance the mended film is the same as the original.

The " British Acoustic " System.

The " Movietone " system employs a separate negative film for sound, but it is printed on a common positive. However, in the British Acoustic Co.'s original system the sound and mute films were entirely separate; that is to say, negatives and positives were taken of each. In recording, the mute and sound positives were run synchronously, but in separate machines. The advantages of this method was that a much larger area of film was available for the sound record than in the case of the combined sound and picture method, which, it is claimed, enables good reproduction to be obtained with less difficulty.

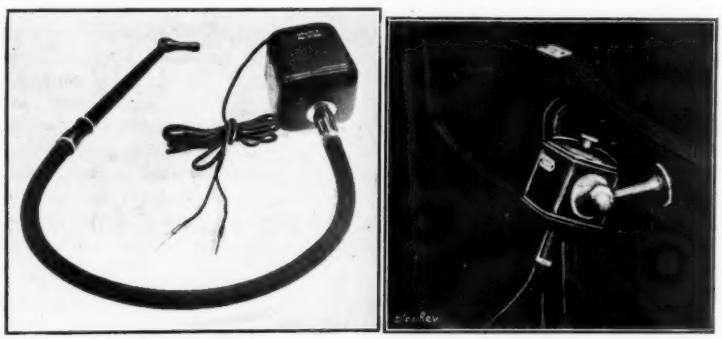
A contour film is certainly more easy to develop than a contrast film, because it is not so critical to what stage of development the process is taken. In a contrast film the strength of the developer and the time of immersion affect the results considerably, as can be appreciated from the Driffield Hurter curve. In addition, the photographer who has charge of the development of the films is better able to deal with the technique of the mute film, in that he is able to give that contrast to the mute film which is generally aimed at, and definition to the sound film, which is always required.

The greatest advantage of the two-film method is, however, the ease with which cutting may be done. If for any reason a certain portion of a film (mute or sound) is not required, then it is possible to remove the unwanted section by running the sound and mute films together on a re-winder, cutting out the desired portion and joining up the ends again. So easy is this operation that it can all be done in a few minutes.

If, on the other hand, it is only desired to change the sound accompaniment, it may be done with equal ease by changing the sound film at any place desired. However, owing to the necessity of standardisation, the British Acoustic Co. has now been obliged to abandon this system and conform to the single-film method, apart from which its present equipment is identical with its original apparatus. A turntable is now fitted in addition to the rest of the equipment, so that the B.A. projector is now equally able to reproduce from both disk and contour or density-type films of standard type. There is no doubt that the two-film method has the greater advantage when much alteration is necessary. Fig. 31 shows the projector used by the British Acoustic Film Co., and fig. 32 the amplifier; the latter needs 400 volts in the anode circuit and delivers an output of 30 watts.

Talking Apparatus for the Deaf.

It may not be generally realised that the mute-film kinema has been the chief form of entertainment that deaf people can enjoy. Now that the talking film has come into use it has detracted decidedly from the enjoyment of the kinema for people hard of hearing, as it puts such places on the same level as the theatre. However, with a slight modification of the reproducing apparatus such detraction may be turned to advantage, for, by by-passing some of the electrical energy normally fed to the loud-speaker through a suitable form of receiver, the audibility afforded to a deaf person by means of such an instrument can in general circumstances be restored to 100 per cent. The particular form of receiver is shown in figs. 33 and 34, and it is hoped that it will come into general use in talking picture theatres in the same way that opera glasses are available in ordinary theatres.



Figs. 33 and 34.—" Supervox " Receivers for the Deaf.

Televised Pictures.

COMING events cast their shadows before . . . and hints of the imminent advent of televised kinematography must be disconcerting to most picture exhibitors. Two years ago the talking picture " arrived " in this country almost suddenly one might say, and threw the whole British film industry into a condition bordering on panic. " Production was stopped. Exhibitors rushed into the arms of the electrical companies and mortgaged their incomes for 14 years, so that their patrons might be thrilled by the noisy tears of ' stars.' The combined hosts of English producers and exhibitors presently lifted their heads in worship of the new Moloch of sound," as the *Daily Mail's* film correspondent puts it. He continues to express the opinion, with some justification, that the British public is becoming a little weary of the elemental essays in entertainment which talking pictures too often afford; they are, not infrequently, so crude.

Clearly the industry is now in the mood for fresh development; indeed, it is in a condition very similar to that in which it was just before the bombshell of " sound " was flung at the world; people had grown blasé to the delights of silent pictures, and the televised news-reel is obviously the development for which filmgoers are waiting. In fact, the news-reel is more often than not the most interesting item of a kinema's programme; for instance, that graphic British " Movitone " record which enabled the occupants of a theatre in London to watch at nine o'clock in the evening of Derby day the finish of that classic race and hear all those cheerful noises that thrill one on the Epsom course. One dares to warrant that it will not be so very long before people will sit in kinema halls and watch pictures of the Derby, not six hours after the race has been run, but actually at the very instant it is being run.

Indeed, it is said that arrangements have been made for the Baird system of television to be demonstrated shortly with the aid of an enlarged screen as part of the variety programme at the London Coliseum. Moreover, that system has been used this month for broadcasting a play, for the first time in England, experimentally from the B.B.C.'s Brookman's Park station on two wavelengths, one for vision and the other for sound.

Rural Electrification.

Views of a Landowner on Some of the Difficulties to be Faced.

By H. C. WOOLASTON.

FROM time to time articles appear relating to the above-named subject, nearly always, as is natural, dealing either with the technical side or else the question of the form of tariff to offer prospective consumers in country districts.

As one of that somewhat abused class of people known as landowners, and at the same time fairly intimately connected with the electrical industry, my view-point may perhaps be of interest, as I think that a better understanding between the two industries would clear away a great proportion of the difficulties that do, and must, arise.

On my estate I have a small sawmill, used for such purposes as cutting out fencing, gate posts, and the like. Until quite recently it had been driven by an 8-h.p. Clayton & Shuttleworth portable steam engine, bought just 50 years ago at the York Agricultural Show; a good record, and one which I hope will be equalled by my new electrical equipment. The engine had to be scrapped, as a leaky fire box made it impossible to raise steam. To replace the engine with a new one would have cost about £300 at least. A cheaper proposition would have been to use an agricultural tractor, which would have cost about £200, but would not have been an entirely satisfactory proposition at that. Accordingly, I approached the local power company and, after considerable negotiation, got it to give me a supply, which it has done, on a guarantee of so much per annum for a term of five years.

The company brought an overhead line, at 6,600 volts, 3-phase, for about two miles to a terminal pole close to the sawmill, where a 50-kVA transformer is mounted on the pole, l.p. supply being given by an underground cable to a 17½-h.p. motor driving the saw, then on to the Mansion House, where, in addition to the lighting, there are several small motors, and then on again to the village room.

I hope to extend it soon to the village itself, but it is here that the real trouble starts. In this village there are no independent freeholders, everyone being a tenant in some way, in the case of farms on a yearly tenancy, and in the case of the cottages, either tied to the farms or mansion, or subject to weekly or monthly notice. None of the occupiers are able to install electricity for themselves. The cottagers have not the means, in any case. The farmers, apart from means, in these difficult times no small matter, do not feel justified in laying out good money when in a year or so's time, through stress of circumstances, they may be compelled to give up their holdings. As it stands at present, the Agricultural Holdings Act of 1923 does not allow them any compensation on leaving, so that the incoming tenant would hardly be likely to pay out money which he knows his predecessor cannot demand. The landlord also is decidedly interested in the question of fire insurance, and the undesirability of having unsuitable gear installed.

The type of village I have sketched above is quite a normal one, of which very many exist throughout England. Where residents are owners as well as occupiers the situation is, of course, quite different, and need not be considered here.

What, meanwhile, is the landlord to do, even assuming that he is wholeheartedly in agreement with the scheme? His position is difficult—very heavily taxed, with a likelihood of being still more so, income tax, surtax, rates, not to mention tithe (surely it is most unfair that he almost alone should be made to support the State Church), and the amount he receives from his tenants after paying the estate outgoings is, almost to a penny, returned to the land, either to maintain rents and assist his own people, or in carrying out such improvements as from time to time officialdom decrees, so that he is not in a position to finance the scheme fully.

What is the solution? I am putting forward four possible suggestions:—(1) The landlord could do it bit by bit, charging 7½ per cent. to 10 per cent. on the outlay (and, incidentally, pay tax twice over on the payments that come in). (2) The farmer could do it, subject, of course, to the landlord's approval to ensure satisfactory work and the necessary amendment of the Agricultural Holdings Act to allow it to be done. (3) The tenant could pay the initial outlay, less a small percentage, the landlord definitely agreeing to compensate him when he goes for the original sum, less an agreed amount for each year. Supposing the installation to cost £22, the tenant would pay £20 down and the remaining £2 in small quarterly instalments, and on leaving be repaid the whole £20 less, say, 10 per cent. for each year of use. In other words, the tenant would finance the work and recover the money when he leaves, less an agreed annual amount to cover the amenities and advantages of electric light and power and depreciation. (4) The power company could finance and carry out the scheme and recover the cost either by small quarterly rental or by so much extra per kWh.

That the power company should do it is, in my opinion, by far the best scheme, and is the one I favour.

The best method of approaching the prospective consumer is undoubtedly through the landlord or his agent, where the latter exists, or the landlord's own contractor.

Most work in the country, of the type I am discussing, is carried out through one, or at the most two, firms, be they builders, electrical contractors, or what not. It is not a general rule to put the work out to competition, at least not to intense or severe competition, but the contractor has to do good work, and he is relied upon to see that it is right, and if it is not then it has to be made so. Either he, or the power company, should make the suggestions to the landlord. For individual manufacturers to approach him or the farmers and others directly probably does more harm than good. Every manufacturer's plant is, in his own opinion and his representatives' opinions, the best, and it is not reasonable to expect that the would-be buyer will have enough knowledge or experience to discriminate, and too many callers may cause annoyance. Agricultural folk are busy people and do not wish to be unduly bothered.

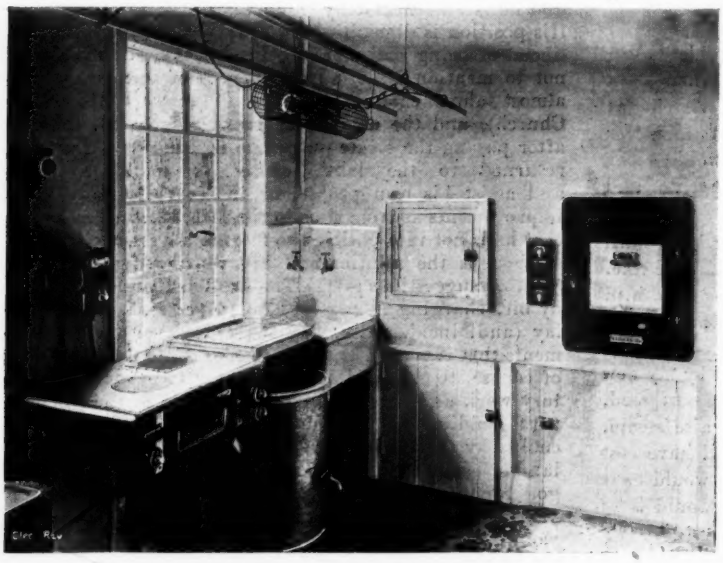
It would be interesting to know how the Government, in its Bedfordshire rural scheme, will deal with this problem, as undoubtedly it will come face to face with it at an early date, if it has not done so already.

Electricity for the Home.

Electrically-equipped houses at Ealing, by Modern Electric Homes, Ltd., and a "record" cooker salesman.

The Elthorne Heights Estate.

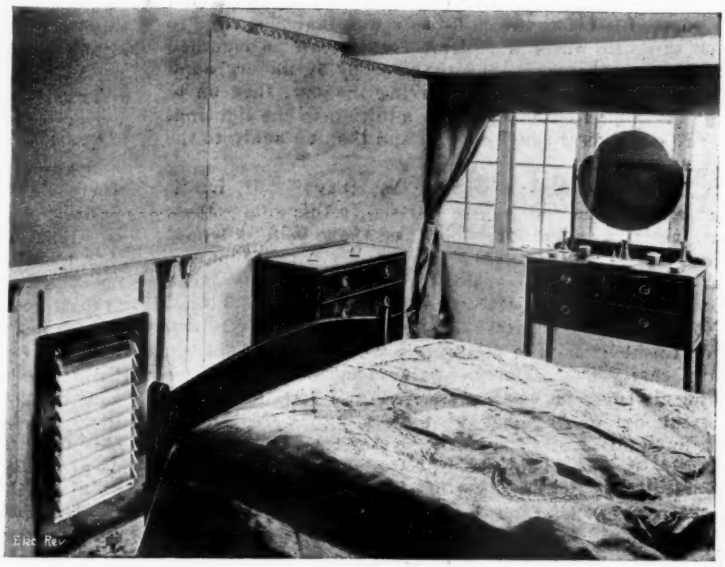
Architects and builders generally have not given that attention to the all-electric house and its advantages which it has merited. We think that it is true to say that in this respect they are behind a very large and growing section of the public. So far anything that has been done on any considerable scale has been done on the initiative of municipal or company electricity supply authorities, and in ordinary housing estates dwellings have only been equipped electrically at the express instructions, and expense, of the prospective tenants. One building company, at least, has realised that there is now an "electrical public" and has set out to satisfy its needs. We refer to MODERN ELECTRIC HOMES, LTD., of which Mr. W. A. Gillott, M.I.E.E., is manager. This company actually provides electrical homes complete from the house itself down to the last lamp. It is not an ordinary building company, it is almost superfluous to say; it is closely allied with several other companies of each of which Mr. A. F. Berry is chairman. These companies supply the land, make the bricks and other materials, the heating and cooking apparatus, and the lamps. The electrical companies concerned are the British Electric Transformer Co., Ltd., and the Kye Electric Lamp Co.



A Kitchenette at Elthorne Heights.

The first estate to be developed by the associated companies is at Elthorne Heights, Ealing, W. There something over 400 houses have been erected. They are of two patterns, either semi-detached or in blocks of four. They comprise a drawing room, dining room, kitchenette, three bedrooms, and a bathroom. Purchasers of the houses are not forced to use electricity—if they are so unwise as to prefer coal or gas they can have it. It speaks well for their good sense, however, that 97 per cent. of the newcomers have selected electricity since Modern Electric Homes, Ltd., commenced operations about fifteen months or so ago. When they decide in favour of electrical equipment the extra cost (£50) is included in the price of the house. Very favourable purchasing arrangements are made, to bring the weekly payments down to a reasonable figure; the houses have thus been put within the reach of people in receipt of very moderate salaries.

The houses are not strictly *all*-electric, for a gas geyser is installed for the hot-water supply. But apart from this all the services are electric. A novel feature of the kitchenette, which saves valuable space, is the building-in of the "Tricity" cooker so that the door is flush with the wall. This also has the effect of conserving the heat to a considerable extent. A separate boiling table and grill are provided. A "Tricity" towel airer is suspended from the ceiling and a wash-boiler of adequate capacity and an iron also form part of the equipment. A view of the kitchenette appears herewith. In each room two power plugs are installed and the rooms are equipped with "Sunray" radiators, which not only emit a gentle but effective heat, but also give out a warm glow. The radiators are properly fitted into the fireplaces.



The Main Bedroom.

Appropriate lighting fittings are installed in each room and the lamps are provided. In fact, the electrical installation is complete to the last detail, and there are none of those vexatious "extras" which irritate the uninitiated and do the cause of electricity no good.

Energy is supplied through a transformer sub-station on the estate by the Metropolitan Electric Supply Co., Ltd. The price is reasonable; the fixed charge amounts to 17s. 6d. per quarter and the running charge is ¾d. per kWh. Payment for electricity can be made quarterly or, as is more usual, through shilling-in-the-slot meters.

A party of Press representatives was invited last week to inspect a house which has been fitted with the standard equipment. The lunch provided was cooked entirely by means of the cooker and boiling table. The energy consumption amounted to only 5 kWh, or 0.5 kWh per person, there being ten at luncheon. It was found that the loss through shrinkage of the joint was only 8½ per cent. The cost of meat being what it is, it was found that the saving actually more than covered the cost of the energy consumed.

These electric homes (there are now about 130 of them) are situated in a healthy and beautiful district.

The company hopes to develop similar estates in various parts of the country, and among the areas upon which it has secured options is one situated by the sea upon which a large number of houses will be erected in due course. The movement is deserving of success and it certainly seems to be securing it.

The New No. 6 "Creda" Cooker.

A Good Publicity Device.

A somewhat novel method of publicity has been devised by CREDENDA CONDUITS, LTD., Oldbury, Birmingham. This comprises an Edison-Bell 10-in. two-sided gramophone record which states all the practical points of the new No. 6 "Creda" cooker (7 to 10 persons) shown in the illustration, though the information is generally applicable to the five other models of the new design.

The record is, we understand, being sent to engineers interested in hiring out cookers and the peculiar merit of the gramophone record as an advocate is that it will almost certainly be turned on at home, where the different points of the cooker as explained can be expertly judged. Incidentally, the speaker has a very clear enunciation. The record, after explaining all the points of the new cooker, concludes by summarising them tersely. A photograph of the No. 6 cooker accompanies the record, and on this is stated adjacent to each component part the merits claimed for it.

The main intention behind the design of these new cookers is simplification of manufacture with a view to low production costs and immediate delivery.

The elements throughout are of the plug-in type, special attention having been given to the design of the pins and contacts; they can be immediately replaced should occasion arise. The boiling accommodation for the hob comprises one fast boiling plate of 1,800 to 2,000 watts loading, one medium-size of 1,000 watts, and one combined grill and simmering plate of 1,800 watts, each controlled by a three-heat regulating switch. The plates are of the enclosed type. By making use of the grill as a simmering plate much-needed extra accommodation is given.

An extra large warming chamber is provided, and the vitreous-enamelled grill pan gives four varying distances from the grill element. The grill chamber is made in one piece to avoid the possibility of liquids entering the lagging chamber, and to permit of easy cleaning. Each of the boiling plates and grill units is self-contained, the connections being entirely enclosed in an ironclad housing.

The oven is constructed in one piece and gives a cooking space 15½ in. high, 16½ in. wide, by 14 in. deep. Elements occupy the whole of the sides and bottom of the oven; top and bottom heat, however, can be substituted if desired. The elements are enclosed in vitreous enamelled steel tubes and are said to be practically indestructible, the actual loading being between three and four watts per square inch. The introduction of this type of element has enabled the loose interior to be dispensed with, and it is claimed that this results in a much quicker heating up with a smaller consumption of current, the approximate time required to reach a temperature of 400 deg. F. being only 20 minutes. The bottom element is shown in the illustration.

Another special feature is that by making use of the side elements for supporting the special reversible rod shelves the whole of the oven is available as cooking space; this arrangement should make cleaning a simple operation. The oven door is provided with a patent self-latching device. The cable employed in the wiring of the oven is specially made of flame-proof vulcanised india-rubber; the whole of the wiring is entirely outside the cooker carcase, and is therefore easily inspected. Switches are of the latest pattern dust-proof type.

The finish recommended is the "all enamel" one, which is said to be practically unchippable; it is employed on all metals used in the manufacture of the cookers, both inside and out. All screws, washers, and nuts are finished by a non-rusting process.

The manufacturers believe it to be unlikely that any further alterations will take place for years to come, and they claim therefore that it will be unnecessary to exchange consumers' cookers from time to time.

Market Research.

The Need for Prompter and More Detailed Statistics.

[COMMUNICATED.]

NOT the least important branch of a business research department is concerned with general tendencies of trade in foreign markets. For the successful promotion of work of this kind it is essential to have access to statistics of production, importation and exportation. This is precisely where difficulties are encountered at the outset, for such data are by no means forthcoming either promptly or in uniform shape. But before examining in what way it might be possible to obtain an improved service of such useful and essential facts, it should be first stated that the frequent delay in their issue is not the fault of the authorities at home, save, of course, in the case of statistics relating to the trade and production of the United Kingdom itself. It is not always realised that complete figures for a given country originate only in that country. Broadly speaking, returns of a country's foreign trade are based on the shipping documents which have to accompany all goods through the Customs. While, therefore, the British Customs can compile information regarding the quantities and values of goods exported from the United Kingdom to, say, Argentina and of those imported into the United Kingdom from that country, it cannot from its own records furnish such particulars with respect to Argentina's trade with other countries. For that information recourse must be had to Buenos Aires. Although this would seem a self-evident fact, yet within the writer's experience London business men have shown surprise at learning that the British Customs did not record the imports and exports of Empire and foreign countries. Indeed, so little do some business men suspect the origin of these volumes that inquirers have been almost pained at finding them printed in a foreign language. And, further, our own Board of Trade is blamed because there are considerable variations between the classifications adopted by the different countries.

Virtually all Governments now publish annually more or less detailed statistics of their country's foreign trade, and the more important of them issue such statistics, though in less detailed form, monthly or quarterly. For a full classification of commodities and a moderately long list of countries of origin and destination, the annual statements must be awaited. In fact with certain exceptions it is almost impossible to obtain a clear view of the trend of the imports into a given country of, say, a particular line of electrical manufacture, until the annual official statement of the foreign trade of that country has been received in London. It will be seen, therefore, how handicapped is the market research officer who depends upon the early availability of reliable trade figures of this kind as a basis for setting on foot some searching investigation.

There is no point in asking why the Commercial Secretaries and Trade Commissioners in their reports do not furnish more up-to-date figures of the trade of the countries in which they hold their appointments. They are dependent, too, on the Customs and statistical departments of the Governments of those countries, and the best they can do is occasionally to obtain access to advance proofs of the official returns.

There is real cause for complaint regarding the time taken in issuing statistics of external trade that are complete to any useful extent. This may be judged from a few instances. For example, the annual statements of the trade of the United Kingdom are not as a rule available until the late autumn of the following year. Similar delay takes place in the publication of the annual statements of the external trade of the United States, although it should be said that monthly accounts issued from Washington are much more detailed in their classification than those of any other country issuing them at such frequent periods. Argentina of late has been a bad example of delay owing, it is said, to the fact that leading members of the staff of the statistical department of the Republic are changed when the Government changes. There is reason to believe that with the return to office of a former exceptionally capable director of statistics an improvement in this respect will now take place. As an example of promptitude combined with a liberal amount of detail Belgium may be cited. The authorities at Brussels issue monthly accounts of the country's import and export trade within a week or two of the close of each month; the classification is fairly full, and the leading countries of origin or destination of the goods are stated. South Africa also stands out for the despatch with which it issues all its statistics—preliminary, monthly and annual, while Canada circulates a vast amount of miscellaneous information regarding production, and issues quarterly returns of external trade with a moderately ample classification.

Some criticism seems warranted on account of the excessive price of the annual statements of the trade of the United Kingdom. Volume 3 last year cost 30s. and Volume 4, 25s., a much higher price than that charged for the corresponding publications of the Department of Commerce at Washington.

With regard to statistics of production it is notorious that when a census of manufacturing output is taken the results frequently are not made known until their value is totally lost. For example, the results of the 1924 Census of Production of the United Kingdom did not appear even in a preliminary form until 1928, and are appearing in final form only now. Even in the United States, which prides itself on promptness in statistical affairs, the latest census figures refer to 1925. It should, however, be added that both in the United Kingdom and in the United States statistics of output of certain of the heavy industries, *e.g.*, iron and steel and motor vehicles, are compiled and circulated by the respective associations. In several countries, too, timely returns of mineral production are available. It might also be mentioned that the returns of the Central Electricity Board of the United Kingdom yield a fund of useful information to those engaged in the marketing of electrical apparatus, although those relating to the period ending in the middle of 1929 have only recently been issued. Very ample statistics of the electricity supply industry are also circulated in the United States. On the agricultural side, by reason of the long-established and elaborate organisation of the International Institute of Agriculture at Rome, crop returns are made available relatively quickly.

Thus it will be seen that while there is a certain amount of data forthcoming sufficiently promptly to serve as a rough guide to anyone desirous of gauging

the general economic position and purchasing capacity of a territory, there are many deficiencies which ought to be made good.

The question now arises what can be done, not merely to expedite the issue of the highly essential statistics of external trade and manufacturing production, but also to induce the authorities to amplify them and make them uniform. To the request for greater promptness, detail, and cheapness, the reply is that these things do not go together. Greater detail means greater delay and greater expense. Attempts have, for a long time, been made by the League of Nations to persuade Governments to introduce a uniform classification. Practically all the countries consulted sympathise with this object, but the trouble is that each considers that its own classification ought to be chosen as the model for all. In the autumn of last year all the delegates of the leading commercial countries of the world undertook to recommend their Governments to furnish on a uniform basis statistics of occupations; general censuses of industrial production and agriculture; production statistics relating to agriculture, mining, metallurgy; indices of industrial activities; index numbers of prices; and statistics of external trade and shipping. It is greatly to be hoped that some practical results will soon be forthcoming.

Liquid Dielectrics.

A method of measuring the specific a.c. resistances of insulating liquids is described, in which the effects of external leakances and capacities are claimed to be entirely eliminated.

By D. H. BLACK, Ph.D., M.Sc.

ONE of the chief difficulties encountered in making accurate alternating current measurements on liquid dielectrics is the fact that the external capacity and leakance of the testing vessel and of the leads to it have to be taken into consideration. In order to compensate for these external effects, more or less elaborate screening systems are frequently employed, and it is thought that a method employed by International Telephone and Telegraph Laboratories, Incorporated, by which accurate measurements of specific a.c. resistance can be made without such aids, will prove of interest.

Darbord[1] has put forward a method of measuring the dielectric constants of liquids in which it is not necessary to know the dimensions of the measuring vessel or to use any standard liquid for calibration purposes, and in which the effects due to the connecting leads, &c., are entirely eliminated. Essentially the method consists in using as a testing vessel for the liquids some form of variable condenser in which all the moving parts not symmetrically placed with respect to the external circuit can be completely immersed in the liquid. Darbord used a condenser of a special design, but a moving-plate condenser is quite satisfactory, providing that no changes of capacity can occur owing to the movement of any indicating arm or other attachment on the spindle. Measurements are taken at each of two settings of the condenser, usually the positions of maximum and minimum capacities, and these must be capable of being located accurately. The moving plates should be connected to the shield, or containing vessel, of the condenser, and the latter should be connected to the low-potential side of the measuring circuit.

Let K_1 and K_2 be the total capacity of the empty condenser and the leads in the two positions. These can be considered as being made up of a capacity C_0, due to the leads, spindle, &c., which is common to both K_1 and K_2, and of the capacities C_1 and C_2 due to the plate system—

$$i.e.,\ K_1 = C_1 + C_0,\ \text{and}\ K_2 = C_2 + C_0$$
$$(K_1 - K_2) = (C_1 - C_2)$$

where $(K_1 - K_2)$ can be determined by any convenient method. If the condenser is now filled with the liquid whose dielectric constant is to be measured, let K_1', K_2', &c., be the corresponding values of K_1, K_2, &c. Then

$$K_1' - K_2' = (C_1' + C_0') - (C_2' + C_0')$$
$$= (C_1' - C_2').$$

But, since the part giving rise to C_1' and C_2' is completely immersed in the liquid, $C_1' = kC_1$ and $C_2' = kC_2$, where k is the dielectric constant of the liquid.

Therefore $k = (K_1' - K_2')/(K_1 - K_2)$ .....(1)

The same principle can be used to determine the specific resistance ρ of a liquid. As is well-known, the effective conductivity G and the capacity C of a condenser filled with a liquid of dielectric constant k are connected by the relation:

$$G = 4\pi/k\rho \text{ .....(2)}$$

The values of the conductivity, G_1 and G_2, corresponding to the two positions of the testing condenser can be considered as being made up of g_1 and g_2 due to the portion in the liquid, and g_0 due to external leakance, &c., common to both.

$$\text{Therefore } G_1 - G_2 = (g_1 + g_0) - (g_2 + g_0)$$
$$= (g_1 - g_2)$$

From (2) above we get

$$g_1 = (4\pi C_1')/k\rho, \text{ and } g_2 = (4\pi C_2')/k\rho,$$

and therefore

$$(g_1 - g_2) = (4\pi/k\rho)(C_1' - C_2') = (4\pi/\rho)(K_1 - K_2),$$
$$i.e.,\ \rho = 4\pi(K_1 - K_2)/(G_1 - G_2) \text{ .....(3)}$$

Thus in order to determine ρ it is only necessary to know the difference of two capacity values of the condenser when empty and the difference of the corresponding leakance value when full of the liquid under test.[2]

Such a method can obviously be used to determine the d.c. values of specific resistance, but it is of greater value for a.c. measurements. The values of $(G_1 - G_2)$ may be determined in various ways, but one of the simplest and most accurate is a form of resonance bridge. Fig. 1 shows the circuit used, in which the arms A, B and Y consist of resistances only. The arm X consists of an inductance L, a capacity C, and a resistance R in series. C consists of the test condenser a and a standard air condenser b connected in parallel, and the resistance r denotes the equivalent shunt resistance of the condensers due to their leakances.

Consider the arm X:

$$Z \text{ (impedance)} = R + j\omega L + [r/(1 + j\omega Cr)]$$
$$= [R + r/(1 + \omega^2 C^2 r^2)] + j[(\omega L - \omega C r^2)/(1 + \omega^2 C^2 r^2)]$$

unless the liquid under test is a very poor insulator, Cr is much greater than unity, and we get

$$Z = [R + 1/(\omega^2 C^2 r)] + j[\omega L - (1/\omega C)].$$

[1] C. R. Acad. Sci. V. 185, p. 1193 (1927).

[2] In deriving these equations the dielectric constant of air has been taken as unity; if greater accuracy is desired this must be taken into consideration; but the applications of the method are not affected.

If L and C are adjusted to resonance, the imaginary term disappears and the arm then has an impedance Z which is equivalent to a resistance when—

$$Z=R+(1/\omega^2C^2r) \quad \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Let R_1, C_1, r_1 and R_2, C_2, r_2 be the values of R, C and r, respectively, when the test condenser is in its two positions.

If $Z_1=Z_2$, then—

$$(R_2-R_1)=(1/\omega^2C_1^2r_1)-(1/\omega^2C_2^2r_2).$$

But if L has not been changed C_1 must equal C_2, since $LC=1/\omega^2$ for resonance.

$$\therefore (R_2-R_1)=(1/\omega^2C^2)(1/r_1-1/r_2).$$

$$i.e.,\ \omega^2C^2\ (R_2-R_1)=(G_1-G_2) \quad \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Hence from equations (3) and (5) we get—

$$\rho=[4\pi(K_1-K_2)]/[\omega^2C^2(R_2-R_1)] \quad \ldots\ldots\ldots\ldots (6)$$

In practice the bridge is balanced with the test condenser in its maximum position by adjusting L, b, R and Y. In this position it is desirable to have b and R at about their minimum values, and to obtain the balance as nearly as possible by adjusting L and Y and changing b and R for the final balance. The value of R ($=R_1$) is noted, and the test condenser turned to its minimum position. The values of L and Y are not changed, and the balance is obtained again by adjusting b and R only, the value R_2 of the latter being noted. In equation (6) the values of (K_1-K_2) and of C are required in order to determine ρ. The former can be obtained by means of any capacity measuring method, and should remain fixed for all future experiments. The value of C must be obtained for each set of readings, and this can be done with sufficient accuracy by disconnecting the fixed plates of the test condenser and adjusting the standard condenser b to the resonance position.

Since the method is a substitution one, no great care has to be taken over the shielding of the apparatus, and the actual values of the resistances in the arms A, B and Y, and of the inductance L do not require to be known. The values of A and B may be quite low, of the order of 20 to 30 ohms, and a loop of fine resistance wire supported in a piece of metal tubing will be found quite satisfactory. The chief difficulties lie in obtaining a satisfactory resistance for R and in obtaining inductances for low frequencies. For the latter commercial radio coils of the plug-in type have been used for frequencies of from 3,500 to 1,000,000 cycles, with a total capacity of from 0.0025 to 0.003 microfarads. For lower frequencies a set of air inductances, having a total inductance of approximately 3 henries, has been obtained, and with these measurements can be made with frequencies down to about 600. For R some form of shunted resistance will be found satisfactory for frequencies up to 100 kilocycles, or even higher, but for the higher frequencies it is desirable to use one of the special resistances designed for radio-frequency measurements. Heterodyne detectors and amplifiers have been found quite satisfactory, though other methods of detection could be used if desired.

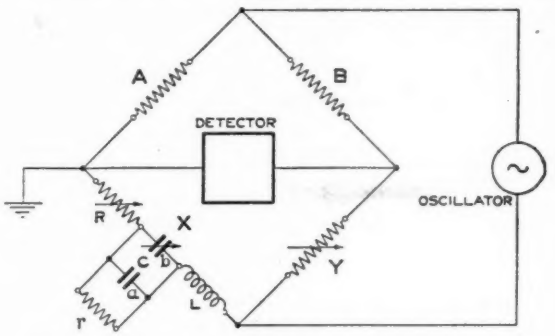


Fig. 1.—Wheatstone Bridge Circuit for obtaining Conductance Measurements.

Business and Industrial Notes.

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures.

Proposed Marking of Imported Meters.

The Board of Trade has referred to the Standing Committee under the Merchandise Marks Act, 1926, an application for an Order-in-Council to require the following classes and descriptions of imported goods to bear an indication of origin:—(*a*) Electricity meters which register by integration over a period of time the consumption or quantity of electricity used in any electric circuit; and (*b*) the following parts of such meters, *viz.*, the case, the rotor, the shunt system, and the series system.

Representatives of any interests substantially affected by the application who desire to be heard in opposition at the public inquiry, which will be held later by the Committee, should communicate with the Secretary, Mr. E. W. Reardon, at the Board of Trade Offices, Great George Street, S.W.1, not later than August 31st, 1930.

Fractional h.p. Motors for Canada.

The British Trade Commissioner at Toronto reports that a manufacturer of automatic fuel oil burners is desirous of being placed in touch with British manufacturers of repulsion induction type motors in sizes of $\frac{1}{3}$th, $\frac{1}{4}$th, and $\frac{1}{6}$ h.p. Further particulars regarding this inquiry can be obtained by firms desirous of offering motors of British manufacture on application to the Department of Overseas Trade, 35, Old Queen Street, S.W.1. (Reference A.X. 9921.)

French "Rationalisation" Scheme.

It is stated that the Compagnie Générale d'Electricité and the Société d'Electro-Métallurgie de Dives are making preparations for the formation of a new company in which will be concentrated their interests in the working up of copper and its alloys. The founders will take equal shares in the capital of the new company and will lease to the latter their copper-finishing works so as to ensure uniform working and sales.

Domestic Appliances in Czecho-Slovakia.

In a recent *Commerce Reports* article upon the Czecho-Slovakian market, Mr. J. W. Bailey, American Consul at Prague, says that the demand for the cheaper standard domestic electrical appliances is met by local manufacturers. Competition from foreign manufacturers is chiefly in the field of specialised articles of comparatively high price. German and Austrian products, however, compete with the cheaper kinds made by the Czecho-Slovakian manufacturers. The most important distributor of electrical appliances in Prague is the municipally-owned Prague Electrical Enterprises. This company handles all types of electrical household appliances and does considerable propaganda work to popularise the use of all electrical equipment. It is also interested in introducing new devices and in expanding the sale of those already known in the market.

The British Industries Fair.

The Committee appointed by the Government under the chairmanship of Lord Chelmsford to consider how the usefulness of the British Industries Fair may be extended and developed, has now completed the taking of evidence, the final witnesses being Sir Edward Crowe, Comptroller-General of the Department of Overseas Trade, and Mr. Claude Taylor, secretary of the British Industries Fair. In view of the volume of evidence taken by the Committee, the report is not likely to be ready before the autumn.

New Indian Electrical Companies.

In April last seven electricity supply companies were registered in India, with an aggregate capital of nearly Rs. 50 lakhs. These were the Electric Supply Co. of Burdwan, Calcutta, with a capital of Rs. 12½ lakhs; the Guntur Power and Light and Nellore Power and Light Companies, both in the Madras Presidency, each with a capital of Rs. 5 lakhs; the Konkan Electricity Co., Bombay, capital Rs. 15 lakhs; the Panvel Taluka Electrical Development Co., Bombay, capital Rs. 2.5 lakhs; the Punjab Electric Power Co., Lahore, capital Rs. 5 lakhs; and the Toangoo Electric Supply Co., Rangoon, Burma, capital Rs. 1.5 lakhs.

Indian Radio Apparatus Imports.

The imports of radio apparatus into India in 1929-30 showed a heavy decline, from Rs. 14 lakhs in 1928-29 to Rs. 7 lakhs. The origins of the imports were as follows:—

	1928-29. Lakhs.	1929-30. Lakhs.
United Kingdom	8.99	3.99
Germany	1.51	.78
Netherlands	.89	1.74
France	2.02	.06
United States	.79	.59
Other countries	.15	.13
Totals	14.37	7.31

Russian Lamp Exports.

According to a report published in a Moscow newspaper, the Ing-Amtorg has received an order for the supply of 400,000 electric incandescent lamps for the city of Montevideo, this undertaking being the Russian company for trading with South America, and the lamps being destined for lighting purposes in connection with the celebration of the centenary of the independence of Uruguay. The production of glow lamps in Russia has been largely forced in recent years, especially at the works of the Svetlana, but this is probably the first large foreign order, if an exception is made of the deliveries to Persia and other countries in the Far East which have been made now and again.

An Inquiry from Australia.

Mr. E. de Launay, managing director of Messrs. MARTIN, DE LAUNAY, LTD., of Sydney and Newcastle, Australia, is now in this country and would like to get into touch with makers of small motor-driven accessories (hand-operated machine tools of all kinds), hair dryers, and all other small apparatus (fans excepted). Inquiries addressed to Mr. de Launay, c/o Service Department, The Electrical Review, Ltd., 4, Ludgate Hill, E.C.4, will be duly forwarded.

Radio Valve Prices Reduced.

The British Radio Valve Manufacturers' Association announced last week that the prices of a number of radio valves made by its members had been reduced as from July 18th. The reduction amounts to half-a-crown in each case.

For Sale.

The Heston and Isleworth Urban District Council has for disposal scrap iron, copper, lead, and unstripped lead-covered cable.

St. Helens Electricity Department has for disposal turbo-alternator plant, a rotary converter, boiler plant, and transformers.

(See our advertisement pages to-day.)

Electrical Manufacturers Combine in Australia.

Reuter (Sydney) reports that negotiations are nearing completion for the formation of an Australian company, in which the General Electric Co., Ltd., the British Thomson-Houston Co., Ltd., and Philips' Glow Lamp Works (Holland) will participate, to acquire the Australian General Electric factory at Newcastle, N.S.W. This factory is designed to supply the whole of the Australian demand for electric lamps.

Australian Duties on Radio Valves.

It is announced that the new rates of import duty on valves for radio-telegraphy and telephony imported into Australia are as follows:—British preferential tariff, 10 per cent. *ad valorem*; intermediate tariff, 15 per cent.; general tariff, 25 per cent. The former rates were: Free, 5 per cent. and 15 per cent., respectively.

Employment during June.

The July *Ministry of Labour Gazette* states that employment in the engineering industry continued bad during June and declined in all areas, particularly in the Midlands and North-Western Divisions. In electrical engineering employment, though declining, remained moderate. It is shown that in the engineering industry as a whole the number of unemployed rose from 130,525 to 145,650 (*i.e.*, from 13.0 to 14.5 per cent.). The electrical section showed an increase from 5,992 to 6,652 (from 7.1 to 7.9 per cent.). The electric cable, wire, and lamp manufacturing group reported a rise from 7,863 to 8,316 (from 8.4 to 8.8 per cent.), but, on the other hand, there was an improvement in the electrical wiring and contracting industry in which the number of unemployed fell from 1,921 to 1,898, reducing the proportion from 11.6 to 11.4 per cent.

Robust Automobile Lamps.

SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD., has received a letter from Messrs. E. Gilling & Sons, Swindon, in which they say that a fortnight ago one of their lorries was used to bring back to Swindon the remains of a motor cycle and sidecar, which had been involved in a collision. The combination had been hit broadside on by a large petrol lorry; the sidecar was destroyed and parts of its chassis driven right through to the motor cycle. The bulbs in the headlamp (which were of "Siemens" manufacture) appeared to be unbroken, and after forcing the switch, which was badly bent, it was found that both bulbs functioned perfectly.

New Uses for Searchlights.

The LONDON ELECTRIC FIRM, South Croydon, has recently supplied to a town in the Midlands a searchlight for carnival

A Searchlight for Carnival Illumination.

illuminations. As will be seen from the accompanying illustration, the searchlight is mounted in a tower and a small electric motor is employed to keep it in continuous rotation. The firm has also recently supplied a searchlight (minus its mirror and lamp) for the purpose of housing a loud speaker in order to enable it to be pointed in the best direction by the traversing and elevating mechanism.

Hungarian Tariff Amendments.

Under the recent addition to the Franco-Hungarian Commercial Convention, a number of modifications have been made in the Hungarian Customs Tariff. A schedule of these published in the *Board of Trade Journal* includes an item "Dynamos, electromotors, transformers and their parts, electric machines, even firmly combined with mechanical constructions (except vacuum cleaners, floor brushes, household washing machines, and refrigerators and their parts)." The duties on these have been altered as follows:—Weighing each less than 250 kg. but not less than 25 kg., raised from 95 to 105 gold kr. per 100 kg.; weighing less than 25 kg., from 120 to 130 gold kr. per 100 kg. The excepted articles are presumably subject to the "general" tariff rates of 140 and 160 kr. per 100 kg.

Electrical Demonstration Houses at Wrexham.

In one of the new housing suburbs of Wrexham two houses have been specially equipped by the Corporation for the display of modern electrical domestic equipment.

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Social Events.

MESSRS. JOHNSON & PHILLIPS, LTD., held their sixth annual sports and gala on July 5th on the firm's ground at Kidbrooke. The meeting was favoured with fine weather and the ground soon became well filled with employés and their friends. The programme, consisting of track and field events, commenced with a relay race for schoolboys in the works district, followed by events which were notable for fast times and good finishes. Between the races the spectators enjoyed the "fun of the fair" at the numerous sideshows, which were all run by the company's staff. At the close of the events the prizes were presented to the winners by Lady Dawson, who was accompanied by Sir Philip Dawson, M.P., a director of the company. Music was provided throughout the meeting by Callender's Band.

Annually a large proportion of the 5,000 employés of Messrs. FERRANTI, LTD., are conveyed by special train to resorts of their own choosing for a day's outing. This year July 12th was the date of this event and three trains went to Blackpool and one to London.

Henley's Sports Club held its 12th annual sports meeting in glorious weather on its new ground at Cragg's Farm, Singlewell, near Gravesend, on July 5th, when a programme of 37 events was carried through with thorough enjoyment to a large crowd of spectators, among them being Mr. Rosling, general manager of the company, and Mrs. Rosling; Mr.

Mrs. Rosling presenting Prizes at Henley's Sports.

Wright, Gravesend works manager, and Mrs. Wright; Mr. Evans, buyer, and Mrs. Evans; Mr. Judge, assistant works manager, Gravesend, and Mrs. Judge; Mr. MacArthur, assistant works manager, North Woolwich, and Mrs. MacArthur. This was the first meeting to be held on the new ground, which is ideally situated. The ground is prepared for many kinds of sport, including cricket, football, hockey, tennis and netball. A handsome pavilion, 160 ft. in length, has been provided by the company. It contains a large dining hall, in addition to efficiently equipped dressing rooms for athletes of both sexes. The prizes were presented by Mrs. Rosling and tea was provided in the main hall of the new sports pavilion. Henley's Orchestral Band played selections of music during the tea. On the following Saturday the annual childrens' treat took place on the same ground, when 560 children of members of the Sports Club had a thoroughly enjoyable time. The accompanying illustration, reproduced by courtesy of the *Kent Messenger*, shows Mrs. Rosling presenting the prizes while Mr. Rosling applauds the successful competitor.

New Catalogues and Lists.

Mr. ALAN WRIGHT, 117, Victoria Street, S.W.1.—An illustrated leaflet giving brief particulars of the "Inventum" milk boiler.

WILD-BARFIELD ELECTRIC FURNACES, LTD., Elecfurn Works, North Road, Holloway, N.7.—A catalogue containing illustrated particulars of the Wild-Barfield forced circulation air tempering oven.

Messrs. CROMPTON PARKINSON, LTD., Guiseley, Leeds.—Specification No. A.202 dealing with "KRN" slip ring motors.

Messrs. JOHN MOORES & Co., Ravald Street Works, Salford.—Price list No. 630 of adhesive tapes, cotton sleevings, tapes, ebonite and other insulating materials.

MAYBROOK ELECTRICAL CO., LTD., 19-21, Wilson Street, E.C.2.—A catalogue of electrical accessories and cables. Illustrated and priced.

DRAYTON REGULATOR & INSTRUMENT CO., LTD., West Drayton, Middlesex.—A revised catalogue list dealing with the company's M.S. "Simplex" temperature regulator. Illustrated and priced.

Messrs. WATSON & SONS (ELECTRO-MEDICAL), LTD., 43-47, Parker Street, Kingsway, W.C.2.—A well-produced catalogue containing particulars, illustrations and prices of X-ray accessories.

Messrs. E. K. COLE, LTD., "Ekco" Works, London Road, Leigh-on-Sea.—Two illustrated folders containing respectively particulars of the company's progress and a window display issued to radio retailers.

SIEMENS-SCHUCKERT (GREAT BRITAIN), LTD., 30-34, New Bridge Street, E.C.4.—A booklet describing the company's multi-language interpretation system.

B.S.A. TOOLS, LTD., Sparkbrook, Birmingham.—A well-illustrated publication dealing with the B.S.A. centreless grinding machine.

AIREDALE ELECTRICAL & MANUFACTURING CO., LTD., Bowling Old Lane, Bradford.—An illustrated pamphlet (No. 30/10) describing the company's l.p. unit pattern steel-clad switchboards for pressures up to 650 V a.c.

Messrs. W. T. HENLEY'S TELEGRAPH WORKS CO., LTD.—A souvenir calendar-blotter book of the second birthday of "Distribution of Electricity." The cover is a charming river scene entitled "By the Thames side in June, Cliveden Reach, Maidenhead," and the pages of blot sheet contain illustrations of the company's products.

PHILIPS LAMPS, LTD., 145, Charing Cross Road, W.C.2.—The July issue of "Building and Lighting," includes interesting articles on cove illumination, methods of lighting, and an example of modern shop window lighting.

STANDARD TELEPHONES & CABLES, LTD., London.—Fully illustrated brochure on intercommunicating telephones for office, home, and factory, descriptive of the company's various types of equipment, components, and accessories.

M.K. ELECTRIC, LTD., Wakefield Street, Edmonton, N.18.—Brochures describing the M.K. safety plug and adaptor and all-insulated switches.

BROOKHIRST SWITCHGEAR, LTD., Chester.—Leaflet 323 giving particulars of contactor type straight-on starting unit.

HELD GLUE & COMPOUNDS CO., LTD., Boar's Head Wharf, Brentford, Middlesex.—A booklet giving the history and applications of "Heldite" jointing.

HIGGS MOTORS, Witton, Birmingham.—A large size reproduction of a sales letter.

Trade Announcements.

The CREDENDA CONDUITS CO., LTD., has found it necessary to extend its accommodation in London and to open its own branch as from July 31st. By arrangement with Messrs. Baxter & Gaunter, Ltd., the company has acquired their premises at 219, Tottenham Court Road, W., which will in future be known as "Creda House." The company also announces that Mr. Harold E. Mortimer, M.I.E.E., late director of Messrs. Baxter & Gaunter, Ltd., has joined it as London Sales Director.

Messrs. TAYLOR, TUNNICLIFF & CO., LTD., have entered into a comprehensive arrangement with the Ohio Brass Company, Mansfield, Ohio, U.S.A., whereby there will be an exchange of technical information between the two organisations, particularly in the production of electrical insulators as used for transmission lines and their attendant gear. The arrangement includes the granting of licences for the use of patents and for the manufacture and sale of various products.

The HENDERSON WIRELESS & ELECTRICAL SERVICE, 54, Queen's Road, Brighton, has now completely rebuilt the portion of its premises which was destroyed by fire, and its stocks of radio and electrical apparatus have been renewed. In reconditioning the premises a showroom, particularly for radio equipment, has been arranged.

Messrs. THOS. A. ROSE & SON, LTD., have opened a showroom in Birmingham under the direction of Mr. C. B. Allsopp, 69, Great Hampton Street, Birmingham, who will represent them in the Midlands.

The head office of HENRION CARBONS, LTD., has been removed to 19, Grosvenor Place, S.W.1. (Telephone: Sloane 2247-8-9.)

The address of Messrs. WILSON & HERD, LTD., engineers, is now Northern Trust Building, 28, Harrison Street, Johannesburg.

Book Notices.

We have received from Mr. F. N. Rendell-Baker, chief engineer and manager of Halifax Corporation electricity undertaking, a copy of the "Halifax Corporation Electric Supply Gazette" for July. This well-produced publication contains many articles on the department's development progress, and includes a schedule of prices and the approximate time taken to use one kWh by various domestic appliances. The publication is fully illustrated.

"Technical Data on Fuel," edited by N. M. Spiers. Second edition. Pp. xiv+242; figs. 40. London: The British National Committee, World Power Conference. Price 12s. 6d. net.

"Rubber, an Economic and Statistical Study," by J. Carlos de Macedo Soares. Pp. xi+93. London: Constable & Co., Ltd. Price 6s. net.

"Storage Batteries," by G. W. Vinal. Pp. x+427; figs. 160. London: Chapman & Hall, Ltd. Price 25s. net.

"The Commutator Motor," by F. J. Teago. Pp. vii+80; figs. 31. London: Methuen & Co., Ltd. Price 2s. 6d. net.

"Definitions and Formulæ for Students (Electrical Installation Work)," by F. Peake Sexton. Pp. iv+26; figs. 7. London: Sir I. Pitman & Sons, Ltd. Price 6d. net.

"Flame-Proof Electrical Apparatus for use in Coal Mines." Safety in Mines Research Board Paper No. 60. Pp. 62. London: H.M. Stationery Office. Price 6d. net.

German Wire Prices.

The Vanelfa Conductor Wire Syndicate, of Berlin, to which all the large German cable manufacturing firms and some 30 special works belong, introduced new selling prices and conditions at the beginning of this month.

Electrical Manufacturing in Japan.

Our Yokohama correspondent says that the Imperial Japanese Railway authorities are making very serious and thoroughgoing efforts to encourage the use of Japanese manufactures in the place of foreign products. They claim that after inquiry they had found that Japanese products were as good as their foreign equivalents and almost invariably cheaper. Among the classes of goods which the authorities say that they can obtain advantageously from Japanese manufacturers are :—Mercury vapour rectifiers, transformers, high-speed circuit breakers, cables, motors and controllers, telephone apparatus, rotary convertors, electric locomotives and switchgear.

It may be mentioned that our exports of electrical machinery to Japan during the first half of the current year were valued at only £38,837, against £146,875 in the corresponding period of 1929. The figures for the past three years have been :—1927, £318,587; 1928, £181,779; and 1929, £232,257.

Economic Mission to South Africa.

Last week the Secretary of the Overseas Trade Council announced that the personnel of the Economic Mission to South Africa would be Lord Kirkley (chairman), Sir Francis l'Estrange Joseph, C.B.E., Mr. John Morgan, and Mr. Robert Waddington; they are respectively representative of shipping, coal-mining, agriculture and cotton-spinning. Mr. J. W. Brigden, Trade Commissioner at Johannesburg, will act as secretary to the Mission, which is to leave for South Africa on August 8th and will include Southern and Northern Rhodesia in its itinerary.

Visit to Metropolitan-Vickers Works.

During their summer meeting at Liverpool last week, members of the Institution of Naval Architects paid a visit to the Trafford Park works of the METROPOLITAN-VICKERS ELECTRICAL CO., LTD. They showed particular interest in the company's marine equipment, including self-contained turbo-generator sets, ranging from 200 to 6,250 kW, which the company has recently developed. Items of equipment for the exhaust turbo-electric propulsion of ships were also shown to the visitors. Other machines which the party inspected included silent motors for the punkah-louvre ventilating system and worm-geared winches. An inspection was also made of the company's million-volt testing equipment and other laboratory equipment.

Unemployment.

There was an increase of 42,925 in the number of registered unemployed during the week ended July 7th. At that date the total was 1,933,500, as compared with 1,890,575 on June 30th, and 1,144,246 on July 8th, 1929.

Wages in the Cable-making Industry.

The Joint Industrial Council for the Electrical Cable-making Industry informs us that there will be no "cost-of-living" alteration in wages in the industry on the third pay-day in August.

A. G.E.C. Mobile Showroom.

The latest method of the GENERAL ELECTRIC CO., LTD., of bringing its products to the notice of electrical contractors and

The G.E.C. Travelling Showroom.

supply authority officials is by means of a travelling showroom. Decorated in the standard G.E.C. colours of black and yellow, the vehicle has the appearance of a large saloon char-à-banc. The driving compartment is entirely separated from the showroom itself, access to the latter being obtained through a door in the near side. Within the van is exhibited a comprehensive range of domestic electrical appliances and fittings, as well as some of the company's lighter industrial apparatus. For purposes of wireless demonstration the show-

An Interior View of the G.E.C. Van.

room has an aerial fitted on the roof. A special battery is provided for the illumination of the van by night.

Bankruptcy Proceedings.

S. KERSHAW and H. ORMIAN, lately trading as S. Kershaw and Co., at Broad Lane, West Derby, and 4, Daulby Street, Liverpool, electrical and radio engineers.—The public examination of these debtors was held on July 15th at Liverpool. A joint statement of affairs presented showed unsecured liabilities of £148, and there were no assets. H. Ormian commenced business in January, 1929, and Kershaw joined him as a partner. They soon found that owing to competition they were unable to sell their stock at a reasonable profit, and they did very little trade. They became aware of their position in September, 1929, and were only able to carry on longer by borrowing from two moneylenders and from a relative. In February last they executed a deed of assignment to which all the creditors with the exception of five had assented. Kershaw stated that he had no separate assets or liabilities apart from those of the firm and attributed their failure to insufficient capital, overbuying of stock, and to competition. The debtor, H. Ormian, confirmed his partner's evidence and said that he also had no separate estate. The examination was closed.

C. M. ANDERSON, trading as the Robin Hood Electrical Company, at 1556, Stratford Road, Hall Green, and as the Maroon Motor Company, 330, Icknield Port Road, both Birmingham, electrical contractor.—The public examination of this debtor was held on July 16th at Birmingham. It was reported that the debtor commenced business as an electrician in 1927 with practically no capital. Since that time he had been connected with various ventures, but none of these had been successful, and in some cases practically no business had been done. In several cases he had raised money to provide capital by entering into agreements with various people to sell them a share of the prospective profits. In this connection the debtor received a sum of £308. He stated that he became aware of his position in August, 1929. The statement of affairs submitted showed liabilities of £544 against assets of £79, leaving a deficiency of £465. The debtor attributes his failure to bad trade due to keen competition, want of capital, damages for breach of contract, loss on a patent battery charger, &c. The examination was adjourned. At the first meeting of creditors held recently, the case, being a summary one, was left in the hands of the Official Receiver as trustee.

R. E. YOUNG, wireless and electrical engineer, 8, Manchester Road, Swindon.—Receiving order made, July 10th, on debtor's petition. First meeting and public examination held July 23rd.

R. DRING, electrical engineer, 257, Freeman Street, Great Grimsby.—First meeting held July 23rd at the Official Receiver's office, St. Mary's Chambers, Great Grimsby. Public examination, August 7th at the Town Hall, Grimsby.

J. CROOK (W. & J. Crook), wireless engineer, 5, Crosby Street, Atherton.—Last day for receiving proofs for dividend, July 30th. Trustee, Mr. J. D. Turner, Byrom Street, Manchester, Official Receiver.

J. C. K. BIRKETT, wireless dealer, 1, Scotland Road, Carnforth.—First meeting held July 22nd at the Official Receiver's office, 9, Cannon Street, Preston. Public examination September 26th, at the Sessions Hall, Preston.

E. F. LEE, electrical engineer, 304a, King's Road, Chelsea, S.W.3.—Discharge granted July 20th.

H. G. EDGHILL, electrical and wireless engineer, 13, Wembley Hill Road, Wembley.—Discharge suspended until August 24th.

H. A. ATACK, electrician and dealer in wireless accessories, 442, Borough Road, Birkenhead.—Last day for receiving proofs for dividend, August 2nd. Trustee, Mr. J. Allcorn, Government Buildings, Victoria Street, Liverpool, Official Receiver.

A. E. SHAPLAND, electrical engineer, Chippenham Cottages, Exmouth.—Last day for receiving proofs for dividend, August 2nd. Trustee, Mr. W. R. Cocks, Exeter Bank Chambers, Broadgate, Exeter, Official Receiver.

Company Liquidations.

J. B. WALSH & Co., LTD.—Particulars of claims to the liquidator, Mr. F. H. Richardson, 24th Bank Street, Bradford, by August 18th.

B. WRIGHT & SON, LTD.—General meeting is called for August 15th, at 26, Park Row, Leeds, to hear an account of the winding-up by the liquidator, Mr. S. Wigglesworth.

BORDESLEY ELECTRICAL ACCESSORIES Co., LTD.—Winding up voluntarily. Liquidators, Mr. A. Brown, Daimler House, Paradise Street, Birmingham, and Mr. W. Hand, Cherry Street, Birmingham.

DURELCO, LTD.—Winding up voluntarily. Liquidator, Mr. H. A. Deed, 90, Cannon Street, E.C.

ARTHUR BURGESS & SON (LUTTERWORTH), LTD.—Particulars of claims by August 6th to the liquidator, Mr. F. E. Bendall, 3, Warwick Passage, Corporation Street, Birmingham.

Private Arrangements.

M. MORRIS, radio dealer and agent, &c., 53, Great Eastern Street, E.C.—A meeting of creditors was held on July 14th, when a statement of affairs was submitted showing liabilities of £18,517 and net assets of £5,050, leaving a deficiency of £13,467. The figures were subject to a contingent claim for income tax, which had been assessed at £5,000, and was under appeal. Mr. E. H. Hawkins reported that the debtor commenced trading in 1921 with a capital of about £5,000. Last year there was a net loss of £1,656, and between January 1st and June 30th this year there was a further net loss of £1,223. It was understood that the cash claims would be withdrawn if the matter was dealt with under a deed of assignment. The debtor said that he was unable to submit any offer, and a resolution was passed in favour of the matter being dealt with under a deed of assignment with Mr. E. H. Hawkins, and Mr. E. J. Webber (Messrs. Percy Mason and Co.), as joint trustees. A committee of inspection was also appointed. The creditors include :—

	£		£
Brownie Wireless Co.	80	Fonteyn & Co., Ltd. ...	408
Bullphones, Ltd. ...	349	Folk, H.	168
Collaro, Ltd.	364	Igranic Electric Co., Ltd.	52
Chloride Electrical Storage Co., Ltd.	150	Siemens Bros. & Co., Ltd.	124
Cleartron (1927), Ltd. ..	63	Wolff, S. J. B. & J. ...	191
D. X. Coils, Ltd. ...	76		

PETO SCOTT Co., LTD., radio and electrical manufacturers and distributors, 77, City Road, E.C., and 62, High Holborn, London, W.C., and at Liverpool and Manchester.—A meeting of creditors was held on July 16th for the purpose of considering a scheme of arrangement. The scheme provided for the payment of preferential claims in full, whilst Mrs. Worthington and the British Radio Gramophone Co., Ltd., who were creditors for the aggregate amount of £14,718, agreed not to participate in the proposed composition, but would allow the amounts due to them to remain unpaid, and without interest until first debentures to be created had been paid off. In addition, Associated Distributors, Ltd., and the Bankers' Commercial Security, Ltd., who were creditors for an aggregate amount of £15,500 in respect of current hire-purchase agreements financed by them on behalf of the company, agreed not to take any steps to enforce payment of their claims against the company, nor participate in the proposed composition. The remaining unsecured creditors of the company were asked to accept a composition of 5s. in the £ in full discharge of their claims. Mrs. A. M. Worthington and Associated Distributors, Ltd., were each to advance to the company £2,000 on the security of first debentures, carrying interest at the rate of 7½ per cent. per annum. After discussion the scheme was approved.

Dissolution of Partnership.

B. & J. WIRELESS Co., wireless component manufacturers, Athelstone Mews, Stroud Green Road, Finsbury Park, N.—Mr. H. A. A. Brosse and Mr. F. B. Banson have dissolved partnership. Mr. Brosse will attend to debts.

Meetings of Creditors.

Messrs. ADAMS & Co., electric light fitting manufacturers, Salford, Manchester, write, in connection with a note which appeared under the above heading in our last issue, to point out that they have no connection with Adams & Co., Ltd.

Local Exhibition.

BURLEY-IN-WHARFEDALE.—An exhibition arranged by Electrical Distribution of Yorkshire, Ltd., was held in the Salem Congregational Church schoolroom, Burley-in-Wharfedale from June 23rd to June 28th. The following firms collaborated. Messrs. H. Metcalfe & Co.; W. E. Beardsall & Co.; General Electric Co., Ltd.; Edison Swan Electric Co., Ltd.; Beatty Bros., Ltd.; Burnley Components, Ltd.; Electrolux, Ltd.; British Vacuum Cleaner Co., Ltd.; and Hoover, Ltd.

Annual Holidays.

The following companies announce that their works and offices will be closed from Friday afternoon, August 1st, until Monday morning, August 11th :—The ELECTRO-MECHANICAL BRAKE Co., LTD., Messrs. R. A. LISTER & Co., LTD., and Messrs. SPENCER (MELKSHAM), LTD. The works of Messrs. ERSKINE, HEAP & Co., LTD., will be closed from this (Friday) evening until August 5th. In each case a small staff will be in attendance to deal with important and urgent matters.

Prices of Materials.

The following prices are only general, and they may vary according to quantities and other circumstances :—

	CHEMICALS, &c.	Price July 22nd.	Fortnight's inc. or dec.
a	Acid, Oxalic ... ... per lb.	5½d.	...
a	Ammoniac, Sal ... ... per ton	£60	...
a	Ammonia, Muriate (large crystal) ,,	£52	...
a	Bisulphide of Carbon ... ... ,,	...	...
a	Borax ... ... ,,	£17	...
a	Copper Sulphate ... ... ,,	£25 10s.	...
a	Potash, Chlorate ... . per lb.	3d. to 4d.	...
a	,, Perchlorate ... ... ,,	5½d.	...
a	Shellac ... ... per cwt.	£13 10s.	...
a	Sulphur, Commercial ... ... ,,	£11	...
a	,, Roll ... ... ,,	£11	...
a	Soda, Chlorate ... ... per lb.	3d.	...
a	,, Crystals ... ... per ton.	£5 to £5 5s.	...
a	Sodium Bichromate, casks ... per lb.	3¾d.	...
	METALS, &c.		
b	Aluminium, Ingots ... ... per ton.	£95 to £100	...
b	,, Wire ... ... per lb.	1/1 to 1/9	...
b	,, Sheet ... ... ,,	1/1 to 2/9	...
p	Babbitts Metal and Anti-friction Metals—		
	Grade I ... ... per ton net.	£129	£1 dec.
	Grade II ... ... ,, ,,	£93	...
	Grade III ... ... ,, ,,	£56	...
c	Brass (rolled metal 2" to 12" basis) per lb.	8¾d.	½d. dec.
c	,, Tubes (solid drawn) ... ,,	10½d. to 10¾d.	½d. dec.
c	,, Wire, basis ... ... ,,	9d.	½d. dec.
c	Copper Tubes (solid drawn) ... ,,	11½d.	½d. dec.
g	,, Bars (best selected) ... per ton	£79	£4 dec.
g	,, Sheet ... ... ,,	£79	£4 dec.
g	,, Rod ... ... ,,	£79	£4 dec.
d	,, (Electrolytic) Bars	£56 16s. 3d.	...
d	,, ,, Sheets ... ,,	£143 10s.	...
d	,, ,, Wire Rods ... ,,	£66 6s. 3d.	...
d	,, ,, H.C. Wire per lb.	8½	...
f	Ebonite Rod ... ... ,,	2/3 to 2/6	...
f	,, Sheet ... ... ,,	2/3 to 2/6	...
n	German Silver Wire ... ... ,,	2/2	3d. inc.
k	Gutta-percha, fine ... ... ,,	nom.	...
h	India-rubber, Para fine ... ... ,,	6/4d.	½d. dec.
i	Iron, Pig (Cleveland No. 3.) ... per ton,	79/6	...
l	,, Wire, galv. No. 8. P.O. qual. ,,	£20	...
g	Lead, English pig ... ... ,,	£19 15s.	5s. inc.
g	Mercury ... ... per bot.	£22 12s. 6d. to £22 15s.	...
e	Mica (in original cases) small ... per lb.	6d. to 8/-	...
e	,, ,, medium ,,	4/- to 8/-	...
e	,, ,, large ... ,	10/- to 20/- & up	...
p	Phosphor Bronze, plain castings ,,	1/2½d.	...
p	,, ,, drawn bars & rods ,,	1/2½d.	...
p	,, ,, rolled strip & sheet ,,	1/3d.	...
p	,, ,, wire ... ... ,,	1/2½d.	...
o	Platinum ... ... per oz.	£8 15s.	...
d	Silicium Bronze Wire ... ... per lb.	10½d.	...
r	Steel, Magnet, in bars ... ... ,,	7½d.	...
g	Tin, Block (English) ... ... per ton	£137 5s. to £137 15s.	£1 5s. inc.
n	,, Wire, Nos. 1 to 16 ... ... per lb.	3/2	...

*For 1 cwt. lots. Special quotations against definite specifications.

Quotations supplied by

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India-Rubber, Gutta-Percha and Telegraph Works Co., Ltd.
g James & Shakespeare.
h Edward Till & Co.
i Bolling & Lowe.
l Richard Johnson & Nephew, Ltd.
n P. Ormiston & Sons.
o Johnson, Matthey & Co., Ltd.
p C. Clifford & Son, Ltd.
r W. F. Dennis & Co.

Messrs. James Forster & Co., in their letter dated July 18th, state that the lead market remains very quiet and reflects conditions ruling in the trade, demand being quiet both here and on the Continent. Arrivals so far are only moderate. The position continues under control and so long as this is the case, current prices can be maintained for a time, although later on economic factors may force a lower level.

Arapuni Station Failure.

As was briefly indicated in our issue of July 4th, the hydro-electric station at Arapuni, New Zealand, which was first put into commission last year, has been closed down, according to the *New Zealand Herald*, as the result of an earth fissure which has developed in the country on the east side of the overflow channel, with consequent fractures in the concrete of the penstock intake structure at the point of juncture with the weir. The main dam was said to be sound, and an examination of the spillway weir proved it to be in order. The water impounded by the main dam has been discharged, and the supply from the station discontinued for an indefinite period. Arrangements have been or are being made for the organisation of supplies from Auckland, Horahora, and the various auxiliary stations to meet the requirements of the city and districts served by the station. Preliminary surveys have made it clear that extensive works, involving very heavy capital expenditure, will be necessary in order to remedy the trouble. For protective works in the overflow channel alone £250,000 is mentioned as an estimate.

According to *Reuter*, owing to the failure of the station, the Auckland Power Board has decided to purchase additional generating machinery for a steam power plant. The tender of a British firm for a 15,000-kW alternator set has been accepted, but the purchase of two boilers has been deferred owing to the disparity between British and German tenders.

Power Station Staffs' Salaries.

In our issue of August 30th, 1929, we reproduced the National Joint Board schedule of salaries for the staffs of electricity supply undertakings as it then stood. Those rates remained in force up to the end of June; then, owing to the fall in the cost of living, a reduction was made as from July 1st, representing 13 points from the basic salaries fixed in 1923. We reproduce the new schedule of salaries herewith. It should be noted that employés in the London (No. 10) Area are entitled to a 5 per cent. addition to the schedule rates; also that in any district where conditions justify a lower remuneration, a deduction of 5 per cent. can be made by mutual agreement.

Title of Grade.	Grade.	Class A 1,000—2,000 kW.	Class B 2,001—4,000 kW.	Class C 4,001—6,000 kW.	Class D 6,001—8,000 kW.	Class E 8,001—13,000 kW.	Class F 13,001—25,000 kW.	Class G 25,001—50,000 kW.	Class H 50,001—100,000 kW.	Class J 100,001 kW. and over.
Deputy chief official	1	£475 13 10	£510 2 7	£559 18 4	£589 10 6	—	—	—	—	—
	2	411 11 9	441 4 11	484 5 11	512 0 10	£554 2 8	—	—	—	—
Power station supt. mains supt. (with charge of sub-station).	3	369 9 11	396 5 8	427 8 5	461 6 9	500 11 3	£590 13 0	£558 18 4	£601 19 4	£361 5 6
Mains supt. (without charge of sub-station).	4	315 18 5	350 7 3	374 5 7	403 13 7	443 3 3	462 5 11	511 1 8	545 10 5	589 10 7
	5	297 14 11	322 12 5	354 3 9	375 4 9	405 17 0	438 7 6	476 11 1	501 10 4	531 3 5
	6	269 0 11	299 13 3	320 14 1	350 7 3	368 10 9	398 3 11	425 18 9	454 12 9	497 13 9
	7	242 4 3	269 0 11	299 13 3	315 18 5	342 14 3	369 9 11	388 16 11	424 0 7	447 18 11
Shift charge engineer	8	242 4 3	242 4 3	269 0 11	294 17 7	310 3 8	336 0 3	358 19 5	372 7 4	407 15 3
	8a	224 17 1	224 17 1	246 6 10	269 0 11	286 5 6	310 3 8	332 3 9	347 9 11	378 2 1
	8b	205 6 5	208 6 5	227 6 8	244 13 11	252 7 0	285 6 3	305 8 0	323 11 7	349 8 1
	9	—	—	208 6 5	224 4 0	240 11 2	260 8 9	279 11 5	299 13 3	320 14 1
	9a	—	—	—	204 6 5	224 0 7	238 2 5	247 8 5	276 8 7	288 3 7
	10	—	—	—	—	204 6 5	208 6 5	219 17 11	234 15 5	256 12 3
	10a	—	—	—	—	—	—	208 6 5	223 4 0	239 14 8
	10b	—	—	—	—	—	—	—	208 6 5	223 4 0
	10c	—	—	—	—	—	—	—	—	208 6 5

Recent Contracts.

The PULSOMETER ENGINEERING CO., LTD., Reading, has recently secured the contract for the hydraulic pumping plant for Leith Docks. The plant is to consist of two sets for 800 gallons per minute and for 600 gallons per minute, each discharging against a pressure of 800 lb. per sq. in. The motors are to be suitable for operating on a 6,600-V supply and will be automatically controlled from an accumulator. In addition, a return water pump and feed tanks, two Venturi tubes, piping and valves are to be supplied. The motors will be made by Messrs. Bruce Peebles & Co., Ltd., and the control gear by the Electric Control Co., Ltd.

The rapid progress of pulverised fuel firing since its introduction to power stations only six years ago is still being maintained, and has an ever-widening claim for consideration when planning new steam generating plant. The North Metropolitan Power Station Co., Ltd., has placed the order for the extension of the Brimsdown power station with INTERNATIONAL COMBUSTION, LTD. This company was the main contractor for the five pulverised-fuel fired boilers installed in 1927. The new plant will comprise four combustion steam generators of 175,000 to 200,000 lb. per hour evaporation at 325 lb. pressure and 780 deg. F. final temperature, each boiler being unit fired by "Raymond-Lopulco" mills. This is the third order for pulverised-fuel plant for the Brimsdown station secured by International Combustion, Ltd.

German Activity in Czecho-Slovakia.

The formation has taken place at Prague, under the title of the Elektrotechna, of a new company to take over the "low-tension" interests of the Siemens and Halske Company in that country, including the Karlin works and the Zenit radio works in Prelouc. The share capital is 16,000,000 Czech crowns, of which the German company holds 49 per cent.

Lighting and Power Notes.

Barking.—YEAR'S WORKING.—The accounts of the Urban District Council electricity department (engineer and manager: Mr. W. E. Kidner) for the twelve months ended March 31st last record a total revenue of £44,102, a working expenditure of £36,036, and a gross profit of £8,066. The figures for the preceding year were: Income, £37,774; working expenses, £27,777; gross profit, £9,997. To the gross profit was added income from other sources making a total of £8,844 available, and after deducting capital and other charges there was a net surplus of £1,587, as compared with £3,857 in the preceding year. Sales of electrical energy increased from 4,013,439 to 5,476,166 kWh and the maximum supply demanded from 1,944 to 2,664 kW. The average price obtained per kWh was 1.704d.

Bedford.—LOANS SANCTIONED.—The Corporation Electricity Committee has obtained sanction to loans of £17,200 for interconnecting switchgear, £2,176 on account of the extension of the generating station, £20,000 for mains, and £20,000 on account of the rural electrification scheme. The Committee is to invite tenders for transformers required in connection with this scheme.

EXTENSIONS.—The Electricity Committee is to extend mains at a cost of £2,750.

The Council has also applied for sanction to a loan of £14,500 for the provision of coal-handling plant at the generating station.

Bognor.—SUPPLY POWERS RESCINDED.—The Minister of Transport has made an Order for the rescission of the powers of the Bognor Gas & Electricity Co., in so far as they relate to the supply of electricity in Aldingbourne, Barnham, and Eastergate.

Brecon.—LOAN SANCTIONED.—The Corporation Lighting Committee has received sanction to the borrowing of £1,990 for plant.

Bridlington.—ELECTRICITY SCHEMES.—The Town Council has obtained sanction to the necessary loans for the changing-over of Bridlington's electricity supply to the national grid scheme. It is intended to embark on an ambitious electric lighting scheme along the entire Bridlington frontage of the bay, to be completed early next year; meanwhile elaborate flood lighting and decorative illuminations are being installed along the promenades for the present summer season.

Caernarvon.—CHANGE-OVER.—The Town Council is to apply for sanction to a loan of £13,788 in connection with the change-over of the system of supply from d.c. to a.c.

Chichester.—EXTENSIONS.—The City Council proposes to spend a sum of £58,016 on a scheme of electrical extension, and has decided to apply to the Electricity Commissioners for a Special Order to extend its area of supply and distribution to include the parishes of Tangmere, Boxgrove, Aldingbourne, Barnham, and Eastergate.

Continental.—RUSSIA.—A message from Novosibirsk says that prospecting work is going on in the region of the future Angara hydro-electric power station. A survey is being made of the basins of the Irkutsk and Kitoi rivers, and of the Angara rapids. Research work is being carried out in the valley of the River Irkutsk in connection with the question of deflecting the river from the Angara to Lake Baikal, which would render possible the construction of a power station of 100,000 kW at the spot where the Irkutsk falls into Lake Baikal.—*Reuter's Trade Service* (Moscow).

Croydon.—NEW SWITCHGEAR.—The Corporation Electricity Committee recommends the provision of switchgear apparatus, &c., at a cost of £4,743.

MAINS EXTENSIONS.—The Electricity Committee is to extend mains at a cost of £1,260.

LIGHTING IMPROVEMENTS.—The Electricity Committee is to improve the lighting in the boiler house and turbine room at a cost of £350. The re-arrangement of the lighting and heating

at the public library is also to be carried out by the Corporation Libraries Committee at a cost of £415.

East Ham.—CABLE EXTENSIONS.—The Corporation Electricity Committee is to extend feeder and distributor cables at a cost of £6,650.

Exeter.—YEAR'S WORKING.—The report on the working of the city electricity undertaking during the year ended March 31st last states that the total income was £84,442 and the working expenditure £42,458, leaving a gross profit of £41,984. After meeting loan charges and income tax there was a balance of £18,906. The net expenditure on capital account during the year was £65,908, bringing up the capital expenditure upon the undertaking to £451,903. The total length of mains laid in the area of supply had been brought up to approximately 156 miles, and the total number of consumers at the end of the year was 8,340, an increase of 1,165. The electricity sold totalled 7,174,844 kWh, an increase of 1,199,135 kWh. The average price per kWh sold was less by approximately 4¼ per cent., although the recent reductions in charges and the alternative "all-in" tariff applied only to the last quarter of the year. During the year an agreement was made with the Exe Valley Electricity Co., Ltd., for the provision of a bulk supply of electricity for distribution over a large area in East Devon. Sanction has been given by the Electricity Commissioners to a further extension of generating plant, which would place the undertaking in a safe position for expansion pending the development of the regional scheme.

ASSISTED WIRING SCHEME.—The Electricity Committee proposes to introduce a scheme of assisted wiring.

Filey.—INAUGURATION OF SUPPLY.—The public supply of electricity was inaugurated on July 14th, when Mr. Crawford, chairman of the Urban District Council, switched on the supply from the station at Scarborough.

Fleetwood.—YEAR'S WORKING.—The gross profit on the Corporation electricity undertaking for the year ended March 31st was £16,216, as against £15,574 in the previous year. The net profit was £5,016, as against £5,614. A sum of £1,581 has been expended in wiring 291 houses under the assisted wiring scheme. The electricity sold shows an increase of 435,828 kWh over 1928-29, or 14.26 per cent. The number of consumers was 4,257, an increase of 366. Of the houses, public buildings, and workshops, in the district, 5,557, or 76.6 per cent., are supplied with electricity. The profit on the showroom after deducting maintenance and management expenses was £251.

Formby.—FREE WIRING SCHEME.—The Urban District Council has applied for sanction to a further loan of £2,000 for the wiring of premises under the free wiring scheme.

Glasgow.—YEAR'S WORKING.—The accounts of the Corporation Electricity Department for the year ended May 31st last show a gross revenue of £1,497,372, a working expenditure of £615,479, and a gross profit of £881,892. Interest on loans accounted for £248,762, and redemption of loans £410,219, leaving a net surplus of £222,910. During the past three years the sales of electricity have increased from 186,000,000 to 251,000,000 kWh, while the number of customers has risen from 70,412 to 96,302. There are now 25,231 hirers of apparatus, as compared with 9,260, while hire-purchase installations have increased from 4,259 to 23,086. The average cost per kWh sold has been reduced from 1.86d. to 1.22d.

Hitchin.—APPLICATION TO PURCHASE UNDERTAKING.—The Urban District Council has applied to the Electricity Commissioners for consent to give one year's notice to the Electric Supply Corporation, Ltd., to purchase the local undertaking.

India.—MADRAS.—The Government of Madras has sanctioned a scheme for the supply of electric power to the towns of Salem and Erode. The scheme contemplates taking power up to a maximum of 500 kW from the main 3,300-V busbars of the Mettur receiving station. The power will be transformed up to 22,000 V and transmitted to Erode and Salem some 32 and 36 miles away. Power at line voltage will be sold in bulk to both municipalities or to a distributing syndicate. The whole installation includes transformers and control gear at Mettur, 22-kV transmission lines from Mettur to Salem and Erode, and reception cubicles containing metering, control and operating equipment at both places. The total expenditure is estimated to amount to Rs. 5.5 lakhs.

Kirkcaldy.—YEAR'S WORKING.—The report on the working of the borough electricity undertaking (engineer: Mr. O. F. Francis) for the year ended May 15th last, records a total revenue of £54,397, a working expenditure of £28,904, and a gross profit of £25,493. The corresponding figures for the preceding year were: Income, £52,868; working expenses, £27,684; gross profit, £25,184. After making provision for capital and other charges there was a net surplus of £4,713, as compared with £2,477 in the preceding year. The capital expenditure during the year amounted to £2,578, bringing the total now spent on the undertaking to £295,310. The electrical energy sold increased from 8,369,095 to 8,528,041 kWh, and the maximum load from 3,520 to 3,720 kW. The average price obtained per kWh increased from 1.513d. to 1.526d.

Kirk Sandall.—TRANSFER OF UNDERTAKING.—Arrangements have now been completed for transferring to the Electrical Distribution of Yorkshire, Ltd., the control of the electricity distribution system established at Kirk Sandall by Messrs. Pilkington Bros., Ltd.

Lathom and Burscough.—ELECTRICITY SUPPLY DECISIONS.—At a recent meeting of the Urban District Council, the clerk, referring to the Order applied for by the Lancashire Electric Power Co., pointed out that the proposed maximum price was 10d. per kWh, as against 8d. per kWh charged by the company at Ormskirk, and that the compulsory area scheduled was not so large as that which the Council had had under consideration. The Council decided to request that the maximum price should be reduced to 8d. per kWh, and that the compulsory area should be extended.

London.—BATTERSEA.—The Borough Council Electricity Committee has been notified that the Central Board will shortly require a supply of electricity from the Council's station.

The Electricity Committee is to provide services at 78 premises, at a cost of £741; to replace old vulcanised-bitumen distributors with armoured cable, at a cost of £8,500; and to improve the supply in the Clapham Junction area, at a cost of £3,000 for feeders, and £1,590 for switch panels, &c.

ISLINGTON.—The Borough Council Electricity Committee recommends the approval of a scheme for the supply of electricity in bulk to the Council.

The Committee also recommends that, except where meter rents are charged, the minimum charge for electricity for power or lighting shall be at the rate of £1 per annum in the case of premises from which either no revenue or only an inadequate revenue is obtained.

Sanction has been obtained to a loan of £6,100 for substation buildings.

IMPROVED LIGHTING AT THE GUILDHALL.—The City Corporation is to improve the electric lighting at the Guildhall at a cost of £2,000.

FULHAM.—The Borough Council Electricity and Lighting Committee recommends the extension of mains at a cost of £855. Sanction has been obtained to the borrowing of £3,842 for mains extensions.

Marlborough.—BULK SUPPLY.—The Town Council has sealed an agreement with the Wessex Electricity Co. for a bulk supply of electricity.

Mynyddislwyn.—ASSISTED WIRING SCHEME.—The Urban District Council has received sanction to the borrowing of £10,250 for the purpose of carrying on its assisted wiring scheme.

Price Reductions.—Reductions in the charges for electricity have been made or recommended in the following districts:—

ABERYSTWYTH.—Lighting: To 7d. per kWh. Power and heating: To 2½d. per kWh. The minimum quarterly charges have been reduced from 13s. 4d. to 8s. 9d. for each of the winter quarters, and to 5s. 10d. for each summer quarter.

SKIPTON.—Domestic power, heating and cooking: First 25 kWh per quarter, 1½d. per kWh; for all additional energy consumed, 1d. per kWh.

Rothesay.—SUPPLY FOR TRAMWAYS.—Negotiations have been proceeding between the Town Council and the Tramway Company regarding the supply of electricity to the tramways. The company is willing to take a supply from the burgh under certain conditions. To maintain a supply the Council will have to add considerably to its present plant, and the electrical engineer has been instructed to prepare an estimate of the cost of the new plant necessary.

Skelton and Brotton.—MAINS EXTENSIONS.—The Urban District Council has applied for sanction to a loan of £1,100 for extending the mains for public and private lighting to the village of Moorsholm.

Southend-on-Sea.—LOANS.—The Town Council has received sanction to loans of £74,705, for e.h.p. feeders and l.p. distributors required in connection with the change-over, and £4,000 for the reconstruction of the switchboard at the London Road generating station. Application has also been made for sanction to a loan of £2,580 for the removal of a 750-kW rotary convertor from Thorpe Bay sub-station to be re-erected in the London Road generating station, and the purchase of a 250-kW rotary convertor and switchgear.

South-West Midlands Advisory Joint Committee.—ANNUAL REPORT.—The annual report of the South-West Midlands Advisory Joint Committee for the year ended March 31st last, shows that considerable progress has been made throughout the district. Additions to the generating plant totalled 78,387 kW, and there were 176 miles of e.h.p. mains and 273 miles of distributors established during the year. The increase in the maximum simultaneous load on feeders was 11 per cent., while connections to mains rose by 13¼ per cent. The number of consumers was 20.5 per cent. above that for 1929, the total energy sold throughout the district increased by 13.4 per cent., and the consumption per head of population showed an advance from 255 to 288 kWh. The report shows that satisfactory advances have also been made in the matter of dealing with undeveloped rural areas, supplies having been made available for the first time in a considerable number of small townships and villages.

South-West Northumberland.—SPECIAL ORDER.—The Electricity Commissioners have submitted to the Minister of Transport for confirmation a Special Order made by them authorising the Newcastle-upon-Tyne Electric Supply Co., Ltd., to supply electricity in the rural district of Haltwhistle and parts of the rural districts of Bellingham and Hexham.

Stockton.—RURAL ELECTRIFICATION SCHEME.—Further progress is being made with the scheme for the electrification of the villages between Stockton and Masham, a distance of over forty miles, by the Cleveland and Durham Electric Power Company. H.p. overhead lines are to be used.

Stoke-on-Trent.—YEAR'S WORKING.—We have received from Mr. Chas. H. Yeaman, city electrical engineer, a copy of his report together with the statement of accounts of the electricity undertaking for the year ended March 31st last. The total revenue amounted to £221,424, as compared with £208,054 in the preceding year, while working expenses totalled £102,617, as against £90,394, leaving a gross profit of £118,807 (£117,660). To the gross profit was added £4,274 income from other sources, making a total of £123,081 available. After providing for capital and other charges there was a net surplus of £13,890, as compared with £12,557 in 1928-29. During the year the capital expended amounted to £178,295, the principal items being £57,528 for plant and machinery, £30,952 for main transmission, and £48,243 for mains and services. The total now spent on the undertaking stands at £1,669,831. Sales of electricity increased from 33,422,778 to 38,245,303 kWh and the maximum supply demanded from 13,056 to 15,400 kW. The average price obtained per kWh fell from 1.52d. to 1.42d., revised tariffs having been brought into force from the September meter-readings. The seventh generating set of 12,500 kW was started up on October 31st last.

Thornton Cleveleys.—LOANS SANCTIONED.—The Urban District Council has received sanction to loans of £6,605 for mains, £550 for plant, and £1,000 for services.

Walton-on-Thames.—LOANS SANCTIONED.—The Urban District Council has received sanction to a loan of £3,500 for mains and services.

West Midlands Joint Electricity Authority.—YEAR'S WORKING.—The accounts of the Authority for the year ended March 31st show a total revenue of £435,980, as compared with £392,929 in the preceding year. The working expenses totalled £272,772, as against £225,177, leaving a balance of £163,208 (£167,752), from which loan charges and sinking fund contributions had to be deducted, leaving a net surplus of £9,923. The capital expenditure during the year amounted to £195,830, the principal item being £121,773 for plant and machinery. The total capital expenditure at the end of the year was £1,956,893. The total capacity of the plant installed was 101,600 kW. The maximum supply demanded increased from 73,320 to 76,000 kW, and the electricity generated from 213,279,120 to 230,973,921 kWh; the electricity sold amounted to 206,131,698 kWh, as against 195,218,010 kWh.

Weymouth.—EXTENSIONS.—The Town Council has approved a scheme for affording a supply of electricity to the Chickerell district at an estimated cost of £12,000, and a grant from the Unemployment Grants Committee has been applied for.

Tramway and Railway Notes.

Algeria.—RAILWAY ELECTRIFICATION.—Work is in hand on the electrification of the railway between Bone and Tebessa, a distance of 144 miles, attention at first being concentrated on the central section of the line, 56 miles between Duvivier and Ould Keberit. The necessary power will be transmitted at 90,000 V from a generating station at Bone, and will be stepped down to 5,000 V at transformer stations at Soukaras, Medjez-Sfa, and Ould-Damas.

Continental.—HOLLAND.—Following the electrification of the railway between Rotterdam and Amsterdam, the authorities of the Dutch railways are now engaged on the electrification of the section between Amsterdam, Uitgeest, and Alkmaar and the branch from Uitgeest to Velsen. The work is expected to be completed by the spring of next year.

Keighley.—YEAR'S WORKING.—Since the abandonment of the tramways in Keighley and the substitution of railless cars and motor-buses, the Corporation tramway undertaking has shown a steady improvement. The financial returns for the year ending March 31st last show that the railless-car services have reduced the previous year's deficit of £4,318 to £2,807. The motor-'bus profits have increased from £405 to £1,100.

Kirkcaldy.—YEAR'S WORKING.—We have received from Mr. O. F. Francis, burgh tramway manager, a copy of his report together with a statement of accounts of the tramway undertaking for the year ended May 15th last. In spite of an increase in the total revenue from £23,666 to £24,348, there was again a gross deficit of £3,061 (£2,512), the working expenditure rising from £26,178 to £27,409. Capital and other charges brought the net deficiency up to £8,631, as compared with £8,256 in the preceding year. There was no further expenditure on capital account during the year. The number of passengers carried showed a further decrease from 4,975,554 to 4,437,895, but the car mileage rose from 452,772 to 480,895. The average total revenue per car mile was 12.151d., as compared with 12.544d.

Leigh (Lancs.).—TRAMWAY ABANDONMENT.—At a recent meeting of the Town Council it was stated that the South Lancashire Transport Co. had given notice of its intention to abandon the tramway from Atherton to Ashton-in-Makerfield at the end of July, and to institute a service of railless cars on that section from August 1st.

London.—NEW TUBE STATION.—A new tube station is to be constructed by the Underground Railways Company at the western corner of Tottenham Court Road and Euston Road at an approximate cost of £250,000, including the site. The station, which is to be on the Hampstead and Highgate line, will take the place of the present Warren Street station. Escalators will be used instead of lifts.

REVISION OF TRAM FARES.—Several alterations in the tramway fares are proposed in a report of the London County Council Highways Committee. As an experiment the Committee recommends that Sunday "2d. all-the-way" fares be instituted during August, September and October. A 4d. child's ticket available for unlimited travel between 8 a.m. and 5 p.m. is also suggested. Other proposals include the provision of intermediate ordinary ½d. fares with a minimum of 1d. and a maximum of 5d. and the extension of the period of operation of workmen's fares for one hour later in the morning than at present.

Southport.—YEAR'S WORKING.—The accounts of the Corporation Tramways Department (manager: Mr. Thos. J. Kendrew) for the financial year ended March 31st last show a decrease from £71,172 to £69,572 in the total revenue. The working expenditure, however, rose from £54,562 to £54,867, making the gross profit £14,705, as against £16,610 in 1928-29. To the gross profit was added income from other sources making a total of £15,274 available. Loan charges absorbed £7,402, and income tax a further £2,108, leaving a net surplus of £5,765 as compared with £5,709 in the preceding year. The only item of capital expenditure during the year was £171 for buildings and fixtures; the present capital invested in the undertaking is £249,509. The number of passengers carried decreased from 12,896,830 to 12,704,225, and the car miles run from 1,197,326 to 1,195,297. The average total revenue per car mile fell from 14.266d. to 13.969d.

Telegraph and Telephone Notes.

Australia.—LOCAL MANUFACTURE.—In some branches of the electrical industry in Australia production is so well advanced that the Postal Department claims that now the only imported materials needed for aerial telephone lines are the small sleeves for jointing the wires and the vulcanised rubber-insulated wire at terminal and intermediate points. In underground construction also it is said that a substantial reduction has been made in the use of imported material. Until recently everything except pipes and conduit to carry the cables was imported; now all the ordinary cable requirements are made locally, and a start has been made with the production of terminal and distributing boxes.

RADIO-TELEPHONY.—Senator G. Marconi had another wireless talk from Italy to Australia from his yacht *Elettra* on July 17th. The occasion was the eve of the opening of the Radio-technical Exhibition in Melbourne, and, despite the fact that the conversation was direct, it was distinctly heard.—*Reuter* (Civita Vecchia).

The Telephone Service.—LIVERPOOL PROGRESS.—During the quarter ended June 30th, 1930, the Post Office received 1,638 applications for new telephones from the area including Liverpool, Birkenhead, Bootle, Wallasey, Wirral, Warrington, Widnes, Runcorn, St. Helens, and the Isle of Man. The number of telephones working in the district was 74,595. The percentage of complaints to the number of subscribers worked out at 0.35 per cent. Eighteen new kiosks have been opened and others have been approved.

Transatlantic Telephony.—PORTUGAL.—It is announced that preliminary tests between Lisbon and London (England) relative to the establishment of telephone communication between Portugal and America have produced satisfactory results.—*Reuter* (Lisbon).

West Indies.—TELEGRAPH CONCESSION.—The International Telephone and Telegraph Company announces that the Netherlands Government, acting through the Governor of Curacao, has granted the All-America Cables Co.'s system a concession to build a 600-mile cable connecting Curacao and Aruba and Bonaire (Dutch West Indies) with the All-America Co.'s cable lines to the South American mainland and with the West Indian system. The concession supplements last year's agreement whereby the All-America Cables Co. was given communication facilities in Curacao.

Radio Notes.

Denmark.—LICENCES.—On March 31st, 1930, the number of licensed listeners was 345,000, an increase of 88,000 during twelve months. By June 30th the number had increased to 374,445, whereof some 8,200 listeners were blind, cripples, and chronic invalids to whom licences are issued free. Thus 106.6 licences per 1,000 inhabitants have been issued. *World-Radio* recently stated that 43 per cent. of the families in the U.S.A. used receiving sets, but in Denmark 46.8 per cent. must use them, for there are about 800,000 families in that country.

North Africa.—WAVELENGTHS.—The sixth North-African Conference recently held at Algiers, at which the following French possessions were represented: Morocco, Tunisia, Algeria, French West Africa, and French Equatorial Africa, decided that new arrangements shall be made on behalf of North African stations, in consultation with the French administration, to incorporate them in the frequency band which has been alloted to France in the general European system. In addition, the Conference decided, says *World-Radio*, that the North African broadcasting authorities should co-operate with the National Meteorological Office in order to find out the most efficacious means of protection against atmospherics.

Rumania.—RELAY CABLE.—For connecting the broadcasting studio and the new transmitting station in Bucharest, the Rumanian Broadcasting Society decided to follow the example of several existing successful installations and to use a special extra-light loaded cable, roughly six miles in length. The new cable, which was supplied by the Siemens & Halske Co., of Berlin, has a guaranteed cut-off frequency of at least 13,000 cycles. For nearly the last two miles the cable runs parallel to a 5,000-V cable on the other side of the road which supplies power to the broadcasting station. The telephone cable comprises four metal-screened relaying pairs of 0.9-mm. copper conductors and three pairs of 1-mm. conductors. Their arrangement is symmetrical, and such that a screened and unscreened pair are grouped alternately around a screened pair in the centre. Six copper wires stranded between the pairs ensure, amongst other things, the good metallic connection of the electrostatic shielding of the conductors, which is insulated from the lead sheath of the cable. The relaying conductors are loaded at intervals of five-eights of a mile by Pupin coils of 13 mH. The required freedom from cross-talk and power-cable interference was attained by crossing the conductors in the jointing sleeves and loading-coil boxes and by inserting condensers in the latter. The results of the extensive acceptance tests carried out by the Rumanian postal authorities on the finished cable were as follows: loop resistance of the relaying pairs (including resistance of coils), 54.0 ohms per kilometre; loop resistance of the telephone pairs, 42.5 ohms per km.; difference in resistance between the "up" and "down" lines of a relaying pair, maximum, 0.08 ohm; insulation resistance of the relaying conductors and the telephone conductors, maximum, 115,000 megohms per km.

U.S.A.—COMMON WAVELENGTH.—Stations WHO at Des Moines and WOC at Davenport, Iowa, have, unknown to the public, been experimentally working on a common wavelength so successfully that they have filed an application with the Federal Radio Commission for authority to synchronise during unlimited hours as a regular operating schedule. The stations, owned by the Central Broadcasting Company, were formerly competitors, dividing time on the same 1,000 kilocycle wavelength. They are separated by 160 miles geographically, and each station uses a power of 5 kW.

Contract Information.

When "Contracts Open" are advertised in our "Official Notice" pages, the date of the ELECTRICAL REVIEW containing the advertisement is given in parentheses below.

Contracts Open.

Australia.—MELBOURNE.—Posts and Telegraphs Department. August 19th. Telephone jacks. (B.X. 6477.)*
August 5th. Telephone cable. (A.X. 9877.)* Testing instruments. (A.X. 9878.)*
SYDNEY.—August 18th. Municipal Council. A.c. consumers' meters. Specifications, &c., from the Construction Engineer, Electricity Department (deposit £1). Tenders to W. G. Layton, town clerk.

Bridlington.—August 9th. Town Council. 11-kV switchgear for the control sub-station. (July 11th.)

Brighton.—August 21st. Corporation. Turbo-alternator, with condensing plant and auxiliaries. (See this issue.)

Canada.—REGINA (SASKATCHEWAN).—August 11th. City Council. Transformers and switchgear (A.X. 9870.)*

Chile.—SANTIAGO.—July 29th. State Railways. Electric clocks. (B.X. 6472.)*

Crook.—July 31st. Electricity Department. Cables and sub-station. Also work in connection with overhead l.p. network. (July 11th.)

Dundee.—Corporation. Electric lighting installation at shops in Kinghorne Road. Particulars from Mr. Geo. Baxter, city engineer.

Egypt.—CAIRO.—Ministry of the Interior. September 9th. Diesel-driven generator. (A.X. 9873.)*
September 14th. Four electric air compressor sets. (A.X. 9886.)*
August 2nd. Electrical plant and material for the Suez power station. (A.X. 9822.)*

Guildford.—Housing Committee. Wiring of 44 houses on the Shepherd's Hill housing estate. Particulars from J. W. Hipwood, Tunsgate, Guildford.

Halifax.—August 18th. Improvements Committee. Electrician's work required in erection of shops and offices. (Bull Green development). Specifications (deposit £2 2s.) from A. C. Tipple, borough engineer, Crossley Street.

Hamilton.—Corporation. L.p. underground cables. (July 11th.)

Ilford.—August 11th. Electricity Department. Dismantling and removal of plant at Suffolk Road refuse destructor. (July 18th.)

India.—SIMLA.—August 4th. Indian Stores Department. Transmission line material. (A.X. 9857.)*

Irlam.—August 20th. Urban District Council. 33-kV underground cables, l.p. distributor cables, sub-station switchgear, and transformers. (See this issue.)

London.—CENTRAL ELECTRICITY BOARD.—July 28th. 132-kV transmission line crossing of the River Thames for the South-East England Electricity Scheme, 1927. (June 13th.)
Foundation works for 132-V transmission line towers over the River Thames near Dagenham. (June 27th.)
August 11th. 33-kV switchgear. (July 11th.)
ISLINGTON.—September 10th. Borough Council. Switchgear for sub-stations. (See this issue.)
LONDON COUNTY COUNCIL.—August 11th. Wiring and fitting buildings on Loughborough Road housing estate. (July 18th.)
August 7th. Cables and fittings for the installation of road lighting at Colindale Hospital, Hendon. (See this issue.)

Malling.—August 1st. Corporation, Electric lighting and heating at the Council's isolation hospital, East Malling.—Particulars from S. L. Bundy, High Street, West Malling.

Milford Haven.—August 8th. Electricity Department. Goods and materials, including meters, &c. (July 18th.)

New Zealand.—WELLINGTON.—Public Works Department. August 12th. 11-kV metal-clad switchgear and accessories for Mangahao. (B.X. 6455.)*
August 19th. Supply and delivery of three single-phase transformers for the Penrose sub-station. (B.X. 6427.)
Post and Telegraph Department. September 2nd. Telephone bells. (A.X. 9871.)*
September 9th. Resistance stools. (A.X. 9867.)*
DUNEDIN.—August 4th. Corporation Electricity Department. Three tons of cadmium copper trolley wire and four tons of hard drawn trolley wire. (A.X. 9785.)*

Northern Ireland.—NEWRY (CO. DOWN).—July 31st. Urban District Council. Oil-engine-driven alternator, with auxiliary plant. (See this issue.)

Salford.—August 2nd. Electricity Department. 33,000-V feeder between Frederick Road works and Trafford sub-station. (July 11th.)

Sevenoaks.—August 6th. Urban District Council. Wiring of 16 cottages. Specifications from John Mudd, clerk, "Inglewood," Oak Hill Road, Sevenoaks.

South Africa.—JOHANNESBURG.—Railways and Harbours. August 11th. Thirteen four-ton electrically-driven portal jib cranes for Table Bay Harbour. (B.X. 9683.)*

City Council. August 2nd. 3-phase truck-type switchboard panels. (A.X. 9811.)* 15 miles of copper trolley wire. (A.X. 9851.)* Bare and weatherproof copper wire. (A.X. 9857.)*

DURBAN.—Railways and Harbours. One 80-ton fixed electric crane for Congella Wharf, Durban Harbour. (A.X. 9727.)

August 15th. Corporation. General Stores Department. Sixteen power transformers. (A.X. 9800.)*

UMTATA.—September 2nd. Municipal Council. Water turbo-alternator, transformer, pipe line and transmission line, together with suspension bridge and telpher gear. (A.X. 9874.)*

PORT ELIZABETH.—July 31st. Municipal Council. Transmission line material, cable, metal-clad switchgear, &c. (A.X. 9892.)*

Uruguay. — MONTEVIDEO. — July 31st. State Electricity Works. 84 three-phase, oil-cooled transformers. (A.X. 9768.)*

Warrington.—August 11th. Electricity Department. Transformers. (See this issue.)

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.

Contracts Closed.

Government Contracts.—The following contracts were placed by various Government Departments during May :—

ADMIRALTY, CONTRACT AND PURCHASE DEPARTMENT.

Electric cable.—Anchor Cable Co., Ltd.; British Insulated Cables, Ltd.; Craigpark Electric Cable Co., Ltd.; Enfield Cable Works, Ltd.; Edison Swan Cables, Ltd.; General Electric Co., Ltd.; W. T. Glover & Co., Ltd.; Hackbridge Cable Co., Ltd.; W. T. Henley's Telegraph Works Co., Ltd.; Hooper's Telegraph and India Rubber Works Co., Ltd.; Johnson & Phillips, Ltd.; Liverpool Electric Cable Co., Ltd.; Macintosh Cable Co., Ltd.

Cells.—Chloride Electrical Storage Co., Ltd.

Electric generating sets.—English Electric Co., Ltd.

Modifications to generators.—Gilbert Austin, Ltd.

Motor generators.—Haslam & Newton, Ltd.

X-ray machines.—A. E. Dean & Co.

Switchgear, &c.—Electric Control, Ltd.

WAR OFFICE.

Batteries and cells.—Siemens Bros. & Co., Ltd.; Ever-Ready Co. (Great Britain), Ltd.; India Rubber, Gutta Percha & Telegraph Works Co., Ltd.; Edison Swan Electric Co., Ltd.

Electric lamps.—General Electric Co., Ltd.

Electric cable.—Hackbridge Cable Co., Ltd.

Secondary cells.—Pritchett & Gold & E.P.S. Co., Ltd.

Electric fans.—Veritys, Ltd.

AIR MINISTRY.

10-kW aerodrome floodlights.—Chance Bros. & Co., Ltd.

Control resistance and voltmeters.—Everett, Edgcumbe and Co., Ltd.

Motor alternators.—Electric Construction Co., Ltd.

Motor blowers.—Small Electric Motors, Ltd.

Switchboxes.—Plessey Co., Ltd.; D. H. Bonnella & Son, Ltd.

W/t valves.—A. C. Cossor, Ltd.

CROWN AGENTS FOR THE COLONIES.

Electrodes.—Quasi-Arc Co., Ltd.

Overhead line materials.—British Insulated Cables, Ltd.

Switches and insulators.—Electric Control, Ltd.

Telegraph ironwork.—Siemens Bros. & Co., Ltd.

Telephone exchange apparatus.—Standard Telephones and Cables, Ltd.

Telephone materials.—Ericsson Telephones, Ltd.; General Electric Co., Ltd.

POST OFFICE.

Supply, drawing-in and jointing of cable (Stockport—Whaley Bridge).—Johnson & Phillips, Ltd. (Chester—Mold).—W. T. Glover & Co., Ltd. (Southampton—Fawley).—Pirelli-General Cable Works, Ltd.

Electric lighting (Whitehall telephone exchange).—Electrical Installations, Ltd.

Power plant (Liverpool repeater station).—General Electric Co., Ltd.

Telegraphic apparatus.—W. G. Pye & Co.

Telephonic apparatus.—Automatic Telephone Manufacturing Co., Ltd.; General Electric Co., Ltd.; International Electric Co., Ltd.; Siemens Bros. & Co., Ltd.; Telephone Manufacturing Co. (1929), Ltd.

Testing and protective apparatus.—Phœnix Telephone and Electric Works, Ltd.; Standard Telephones and Cables, Ltd.

Battery stores.—D.P. Battery Co., Ltd.; Edison Swan Electric Co., Ltd.; Hart Accumulator Co., Ltd.; Tudor Accumulator Co., Ltd.; C. A. Vanderwell & Co., Ltd.

Cable.—British Insulated Cables, Ltd.; Callender's Cable and Construction Co., Ltd.; Connollys (Blackley), Ltd.; W. T. Glover & Co., Ltd.; Hackbridge Cable Co., Ltd.; W. T. Henley's Telegraph Works Co., Ltd.; Johnson & Phillips, Ltd.; Pirelli-General Cable Works, Ltd.; Siemens Bros. & Co., Ltd.; Standard Telephones and Cables, Ltd.

Loading coils.—General Electric Co., Ltd.; Siemens Bros. and Co., Ltd.

Dynamotors.—Walter Jones & Co., Ltd.

Petrol engine battery charging sets.—Stuart Turner, Ltd.

Bronze wire.—F. Smith & Co.

Covering bronze wire.—Siemens Bros. & Co., Ltd.

Flameproof wire.—Enfield Cable Works, Ltd.; Macintosh Cable Co., Ltd.

H.M. OFFICE OF WORKS.

Cooking apparatus.—Falkirk Iron Co., Ltd.

Mercury arc rectifier equipment.—Hewittic Electric Co., Ltd.

Switchboard.—English Electric Co., Ltd.

Cables, &c., South Kensington generating station.—G. E. Taylor & Co.

Changing electricity supply, Westminster new public offices.—J. Briggs, Electrical Contractors, Ltd.

Isle of Thanet.—Joint Hospital Board. Accepted :—

Electric light installation at the Haine Hospital (£1,164).—Harden & Chinery.

London.—METROPOLITAN WATER BOARD. Recommended :—

Steam-driven centrifugal pumping engine for Kempton works (£833).—W. H. Allen, Sons & Co., Ltd.

Two steam-driven electric generators, switchboard and piping for Deptford pumping station :—

Peter Brotherhood, Ltd.	£2,985
Browett, Lindley & Co., Ltd.	3,039
ASHWORTH & PARKER (Recommended) ...	3,055
W. H. Allen, Sons & Co., Ltd.	3,140
Bellis & Morcom, Ltd.	3,232
Rotax (Motor Accessories), Ltd.	3,250
Rees Roturbo Manufacturing Co., Ltd. ...	3,303

FULHAM.—Recommended :—

50 tons of copper cable (£2,825) and 60 tons of lead cable (£1,170).—W. T. Henley's Telegraph Works Co., Ltd.

LONDON COUNTY COUNCIL.—Central Public Health Committee. Accepted :—

X-ray apparatus at High Wood Hospital (£250).—Schall and Co., Ltd.

Fire alarm and automatic telephone installation at Queen's Hospital, Sidcup (£867).—Berkeley Electrical Engineering Co., Ltd.

Electrical goods and bed lift at Tooting Home (£618).—Wm. Wadsworth & Sons, Ltd.

ISLINGTON.—General Purposes Committee. Recommended :—

Alterations and additions to electrical installation at Town Hall (£114).—Shepperton & Dooley.

Works Committee. Recommended :—

Electrical installation at Ashburton Grove dêpot (£146).—Jacob, White & Co., Ltd.

ST. MARYLEBONE.—Electric Supply Committee. Recommended :—

Renewal of contracts for electricity meters for the year ending September 31st, 1931.—Chamberlain & Hookham, Ltd., and Ferranti, Ltd.

Flue dust extraction plant (£1,761).—Sturtevant Engineering Co., Ltd.

GREAT WESTERN RAILWAY CO. Accepted :—

Overhead contact line at Queen Alexandra Dock, Cardiff.—Callender's Cable & Construction Co., Ltd.

Twenty-four electric 3-ton luffing jib cranes.—Stothert and Pitt, Ltd.

South Africa.—CAPE TOWN.—Electricity Committee. Recommended :—

Copper wire (£3,177).—British Insulated Cables, Ltd.

30 miles of insulated wire (£574).—Dowson Dobson and Behr, Ltd.

Galvanised stay wire (£86).—William Bain & Co. (S.A.), Ltd.

1,000 30-ft. electric light poles (£4,587).—Dowson Dobson and Behr, Ltd.

Southend-on-Sea.—Town Council. Accepted :—

One pair of motors (£326).—English Electric Co., Ltd.

One pair of controllers (£85).—British Thomson-Houston Co., Ltd.

One pair each of motors and controllers (£370) and 250-kW rotary convertor and switchgear for Thorpe Bay sub-station (£1,068).—General Electric Co., Ltd.

The "Electrical Review" Service Department.

INQUIRIES must be accompanied by a stamped addressed envelope.

We shall be glad to learn the names and addresses of makers of the following devices:—

"HEEXIN" tape.
"LANGHAM" motor.
"NATIONAL" vacuum cleaner.
"VERA" daylight unit.
"DANDY" electric floor polisher.
"BECKETT" electrical washer.

Notes.

Aluminium Bus-bars.

Bearing in mind Mr. W. E. Warner's article in the ELECTRICAL REVIEW of January 24th last on "Joints for Aluminium Bus-bars," it is interesting to learn that the Compagnie Parisienne de Distribution d'Electricité has adopted aluminium bus-bars in connection with the recently completed extensions at the Issy-les-Moulineaux generating station, and at several sub-stations. At the power station, according to an article by M. F. Atthalin in a recent issue of the *Revue de l'Aluminium*, such bars to the extent of over 19 tons and measuring 100 by 5 mm. and 50 by 5 mm. have been adopted.

Fatalities.

An inquiry was held recently at the Dunfermline Sheriff Court into the death of Archibald Connor, coal-cutting machineman, who died on July 4th at the Minto Colliery of the Lochgelly Iron & Coal Co., Ltd., as the result of an electric shock. A coal-cutting machineman stated that he had found Connor lying dead beside a gate-end box. The lid of the box was open and Connor's right hand was inside, resting on the fuse holders. His hand was badly burned. The handle of the box was in the "off" position, and it should have been possible to open the box and handle the fuses without danger. The manager of the colliery stated that the box was two years old and that when it was examined after the accident it was found that the interlocking clutches were worn, and the handle, instead of being secured to the spindle by a split pin, was secured by a piece of copper wire. The senior electrician at the colliery explained that one of his assistants reconditioned the gate-end box before it was installed on June 10th, and at that time the clutches were not in the condition in which they were now; the type of box was one which they had been using for a number of years, and they had found it to be quite a satisfactory appliance. At the close of evidence the Sheriff suggested to the jury that they should add to the formal part of their verdict a rider that they were of opinion that the gate-end box was in a dangerously defective condition owing to excessive play between the clutch on the switch handle and the clutch with which it engaged, and also owing to the handle being insecurely fixed, and other defects. The jury agreed.

An inquest was held on July 15th at Thames Ditton on Rowena May Kettel, of Oxshott, who received a fatal electric shock on July 12th. Evidence given showed that there was a garden party at her home and that the grounds were illuminated by electric lamps. Children were playing around a pond and Miss Kettel grasped a tripod in the centre of the pond and fell. The voltage was 220 and the switch was off. An electrician who had a contract for installing electricity in the house said that owing to a mistake the positive wire was taken to the plug instead of to the switch. This had the effect of keeping a live side on the temporary wire irrespective of the switch being off. Had the wires been properly insulated nothing would have happened. Mr. W. H. Owen, of Electric House, Leatherhead, said the cause of the accident was that a bare part of the flexible was touching the suspension wire which was connected to the tripod. When the girl caught hold of the tripod the current passed through her body to earth through the water. A verdict of "Accidental death" was recorded.

A Two-million Volt Laboratory.

A testing laboratory has recently been opened in Bavaria by the Rosenthal Porcelain Works for the investigation of questions of insulation for very high voltages. It was considered that, in view of the present use of 220 kV on the Continent and its probable increase to 380 kV and above in the future, 1,000 kV would not be a sufficiently high pressure, and it was therefore decided to provide for 2,000 kV.

The dimensions of the laboratory are 20×22×21 metres, this large space being necessary in order to prevent the jumping of the arc from the apparatus to the walls. This building houses two independent installations; first, the a.c. installation at standard frequency; and secondly, the d.c. impulse installation, which permits insulators to be subjected to travelling impulse waves that simulate lightning conditions. There is also a 2,000 kV high-frequency installation still housed in the old testing shop.

Two transformers, each 1,000 kV to earth, have been provided, and the first of these is already in use; with the exception of a smaller transformer elsewhere, this is said to be the only unit of this voltage in a single container. The transformer is 8 metres in over-all height. Each of the copper balls used for measuring the voltage weighs 700 kgm. and has a diameter of 2,400 mm., compared with 1,000 mm. for the largest size of ball previously constructed.

The d.c. impulse plant is claimed to be the largest of such installations in existence. The separate condensers for producing 2,200 kV are super-posed to economise floor space. The balls are 1,500 mm. in diameter. The whole of the switching operations are to be effected from a central point, *i.e.*, the switch desk on the gallery, so that the engineer undertaking the tests is not compelled to walk from one switch to the other in order to operate them; it has thus further been ensured that the whole of the testing shop may be freely surveyed. For the purpose of avoiding accidents all doors have been provided with contacts which cut out the switches on the doors being opened.

Generation of Electricity in June.

The official returns rendered to the Electricity Commissioners show that 709 million kWh were generated by authorised undertakers in Great Britain during the month of June, 1930, as compared with 694 million kWh in the corresponding month of 1929, or an increase of about 2.2 per cent.

During the six months of 1930, up to the end of June, the total amount of electricity generated by authorised undertakers was 5,381 million kWh, as compared with 5,098 million kWh for the corresponding period of 1929, representing an increase of 5.5 per cent.

A Novel Electric Sign.

An interesting specimen of the sign workers' art is being erected at Singapore, on the premises of the Tiger Balum Company. The main structure consists of an octagonal lattice steel supporting tower about 30 ft. high, which surmounts the actual building. Around the tower are placed six sets of panels with the wording "ENG AUN TONG—THE TIGER BALM—ENG AUN TONG." These panels are of stove-enamelled sheet-steel, with lamp-outlined trough lettering superimposed

An Illuminated Animal Sign.

on the faces of the panels. A motor-driven spelling flasher, with separate insulated drums to suit a three-phase electricity supply, serves to operate the lettering on the panels. On the summit of the tower is placed a faithful replica of a tiger, more than life size, constructed on a skeleton framework of wrought-iron and glazed with mosaic leaded glass, the colours being carefully selected to obtain a true representation of the colouring of the animal. Opal gasfilled lamps are used in the interior of the model for illumination purposes, and the whole effect is striking. The working of the glass mosaic to the constantly varying curvature of an animal form is really a work of art, and calls for highly expert craftsmanship. There are no fewer than 5,000 separate pieces of stained glass in the mosaic. The sign was designed and manufactured by STRAND & INTERCHANGEABLE SIGNS, LTD. (STRANSIGNS).

Determination of Insulation Resistance.

Mr. J. A. C. Teegan, M.Sc., A.Inst.P., Lecturer in Physics, University College, Rangoon, informs us that he has developed a highly accurate method of determining very high (insulation) resistances. Anyone interested should apply to Mr. Teegan for particulars.

Educational.

The 1930-31 session of the Faculty of Science at the Birmingham University commences on October 6th. (For particuluars see advertisement in this issue.)

Appointments Vacant.

Assistant underground engineer in the Telephone Department of the Egyptian State Railways, Telegraph and Telephone Administration.

Lecturer in electrical engineering at Birmingham University.

Clerks for Battersea Electricity Department.

Salesmen for Irish Free State Electricity Supply Board.

Teachers in electrical engineering at Paddington Technical Institute.

Charge engineer for Cardiff Electricity Department.

Junior charge engineer for Gravesend Electricity Department.

Electrical mechanician for Tanganyika Posts and Telegraphs Department.

Electrical engineer for Mains Department of the Calcutta Electric Supply Corporation, Ltd.

Graduate master in electrical engineering at Sheerness Technical Institute.

(See our advertisement pages to-day.)

Electricity at the World's Poultry Congress.

The World's Poultry Congress at the Crystal Palace, which was to be opened by H.R.H. the Duke of York on July 22nd, and is to continue until the 30th, is a practical demonstration of the great assistance that electricity is rendering to the poultry farmer.

In the Trading Section of the exhibition that is being held during the Congress, a number of manufacturers are showing electrically heated incubators and brooders, in all sizes, from 100-egg capacity, suitable for the man whose poultry is his hobby, to the mammoth incubator that will produce thousands of chicks every week for the big breeder. All these are automatically controlled and guaranteed to maintain a practically straight-line temperature chart.

It has been abundantly proved that an even temperature throughout the incubation period, and above all an ample supply of pure humidified air, unpolluted with oil or gas lamp fumes, are two of the chief essentials for the production of strong, healthy chicks.

In addition to poultry experts from all over the world, an enormous number of the home poultry keepers are making the Congress their Mecca. For the instruction of these there are the working demonstrations by the trade exhibitors, showing the many appplications of electricity to the poultry farm, while on the advisory side the Scientific Poultry Breeders' Association, of Rudgwick, Horsham, has enlisted the help of the British Electrical Development Association, Inc., to assist their members with advice on all matters connected with the use of electricity on the poultry farm. For this purpose an E.D.A. representative will be in attendance on the S.P.B.A. stand during the Congress to discuss such matters personally with poultry men.

A special illustrated pamphlet has been published by the E.D.A. entitled "Electricity in Poultry Farming," which is instructional for the poultry man on electricity, and the electrical man on poultry. Copies of this can be obtained on the S.P.B.A. stand during the Congress, or by application direct to the British Electrical Development Association, Inc., 15, Savoy Street, W.C.2.

The Electrical Association for Women.

Mr. A. S. Redvers Pratt, director of Messrs. Christopher Pratt & Sons, Ltd., electrical contractors and general furnishers, Bradford, lectured to the Bradford branch of the Association recently on electrical refrigeration in the home. Mr. Pratt, mentioning that most up-to-date dealers in provisions now had electrical refrigerators on their premises, said it was not very much use keeping foodstuffs in good condition in the shops if they were not to be maintained in the same wholesome condition in the home.

BRISTOL AND DISTRICT BRANCH.—A garden party was held on July 9th at Sunny Hill House, Shirehampton, at the kind invitation of Mr. and Mrs. A. M. Willis. About 150 guests were present, among whom were the Hon. Mrs. John Inskip (president), Miss G. M. Morgan, M.A. (vice-president), and Mrs. Harold Robinson. The guests were received by Mrs. A. M. Willis and Mrs. H. R. Beasant (chairman of the council).

Electricity and the Lyceum Club.

The Lyceum Club, Piccadilly, has started an Industry and Commerce Section. It was considered by the Section that electrical development was one of the most important questions of the day, and agreed that the first dinner should be devoted to this subject; it was held at the Club on July 7th.

The chair was taken by Lady Moir, O.B.E., president of the Women's Engineering Society, and the speakers were the Lady Emmott, J.P., Miss C. Haslett, Councillor Mrs. Gregory, and Miss Partridge, B.Sc., A.M.I.E.E. Speeches were also made by Miss Flora Drummond and Miss Helen Fraser, who has lectured extensively in Canada and America.

The enthusiasm at the dinner indicated yet again the great interest of women in the modern applications of electricity.

Institution of Electrical Engineers.

GRADUATES' EXAMINATION.—The results of the graduateship examination held in May, 1930, show that 116 candidates successfully passed the whole examination, 21 passed Part I only, and 7 passed Part II only. The results relating to candidates who sat for the examination abroad will be published later.

Electricity on the Swedish Countryside.

The Swedish Government, alarmed at the threatened depopulation of the country, passed in 1918 a law which was intended to ameliorate the lives of those living in rural districts. It provided for the employment of all Swedish rivers for hydro-electric purposes, and the result has been that electricity has made great progress; 513,000 country people use it continually in one form or another, and electric wires run over hundreds of thousands of acres that formerly were deserted and uncultivated. In field, barn, and stable, electrical machines are speeding up agricultural labour, and, thanks to their use and to the benefits in general of electrical energy, the danger of depopulation is at an end, and the need for emigration no longer exists. The following figures speak for themselves so far as farming is concerned, most of the motors employed being of from 2 to 5 h.p. and easily transportable:—Chaffcutters turning out 600 and 1,900 kg. per hr.; rootcutters turning out 2,300 kg. per hr.; outdoor thrashing machines yielding 17 hec. lt. per hr. corn; indoor thrashing machines yielding 15 hec. lt. per hr. oats; oil-cake crushers turning out 1,400 kg. per hr.

Our Personal Column.

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements.

Mr. F. H. Crittall, governing director of the Crittall Manufacturing Co., Ltd., on the occasion of his 70th birthday, is to be presented to-morrow (Saturday) with his bust which has been executed in bronze by Mr. Reid Dick, R.A.

Mr. F. J. Elliott, of the Bristol Corporation Electricity Department, has been appointed chief assistant electrical engineer to the Wolverhampton Corporation. He was to take up his new duties on Monday last. His connection with the Bristol undertaking has extended over a period of 22¼ years. A solid silver occasional tea service was presented to Mr. Elliott on July 18th by Mr. H. Faraday Proctor, chief engineer and general manager, on behalf of the staff. Mr. Elliott also received a smoker's cabinet from the mains employés, and a walking stick from the Temple Back sub-station staff.

Mr. Bertram Kelly, borough electrical engineer of Douglas (I.O.M.), was recently recommended by his Committee for special remuneration of £100 for his services as clerk of the works during the erection of the Pulrose power station. Objection was made to this payment, as it was in the nature of capital expenditure upon which the consultants would receive a percentage, and the proposal was rejected by the Council. It was also decided that in future consultative fees should be apportioned by the Electricity Committee between the Department and the borough electrical engineer, and that prior to the engagement of articled pupils the engineer should submit the matter to the Committee for approval.

Mr. H. J. Sheppard has been appointed managing director of Messrs. Johnson & Phillips, Ltd., in succession to Mr. John Macgregor, whose death is announced in our "Obituary" section.

Mr. H. Anderton, who has recently retired from the position of an inspector in the Post Office Engineering Department, Maidstone, on July 14th received a presentation from his colleagues and friends in the Canterbury Engineering Sections.

Mr. A. L. Lunn, as we announced a fortnight ago, is relinquishing the post of deputy chief engineer of Manchester Electricity Department. He is joining the London Underground Railways on September 8th, where he will assist in the generation, distribution, and future development of the power supply of the system.

Mr. Lunn was born at Northallerton, Yorks., in 1883; he received his technical education at Harrogate and Leeds, and later served an apprenticeship with Mr. R. Falshaw, of Harrogate. In 1906 he joined the Manchester Electricity Department and remained at the Stuart Street station as a

junior engineer until 1910 when he went to Sunderland as engineer-in-charge at the Hylton Road station. He returned to Manchester in 1915 to take up a similar position at Stuart Street. Thereafter he became successively senior engineer-in-charge, turbine house superintendent, assistant resident engineer, resident engineer, superintendent of power stations and (in 1927) deputy chief engineer. Mr. Lunn is a member of the Institutions of Electrical and Mechanical Engineers; he was hon. secretary of the North-Western Centre of the I.E.E. for the 1925-26-27 sessions, and is the next chairman of that Centre.

Lafayette [*Manchester.*

Mr. A. L. Lunn, M.I.E.E., M.I.Mech.E.

Who is leaving Manchester to take up a position with the London Underground Railways.

Mr. Theodor Petersen, whose appointment as assistant managing director of Callender's was announced in our last issue, was born at Edgbaston, Birmingham, in 1868. He was educated at Clifton College, Bristol, and at the Zurich Polytechnic. He served his time with Marshall, Sons & Co., of Gainsborough, and with the Brush Electrical Engineering Co., Ltd., and entered the latter company's employment at the end of his apprenticeship. He subsequently joined the Bournemouth Electric Light Company, and afterwards was for two years in Denmark and Sweden engaged in general and civil engineering work. He entered the service of Callender's in 1895 as assistant to Sir (then Mr.) T. O. Callender, the managing director, and has been closely associated with him in the development of that undertaking and its associated concerns. He is a director of the Anchor Cable Co., Ltd., the Surbiton Contract Co., Ltd., and T. W. Petersen, Ltd., of Birmingham. He has been a member of the Institution of Electrical Engineers since 1905, having entered the Institution as an associate in 1891. Mr. Petersen's portrait accompanies these notes.

Mr. Th. Petersen.

Assistant Managing Director of Callender's.

Obituary.

Mr. John Macgregor.—We deeply regret to record the death, at the age of 68, of Mr. John Macgregor, chairman and managing director of Messrs. Johnson & Phillips, Ltd., which occurred on Sunday last, July 20th. Mr. Macgregor joined the company as an articled pupil in 1875 and remained with it without a break until his death. When Johnson & Phillips became a limited company in 1905 he was appointed managing director, a position which he retained upon his appointment as chairman in 1928, when he succeeded Mr. Claude Johnson, one of the founders of the company. Mr. Johnson died in June, 1928, very shortly after his retirement. About a year ago Mr. Macgregor was involved in a serious motor-car accident and he never recovered from the injuries which he then sustained. The funeral was to take place at Charlton Cemetery yesterday (Thursday).

The Late Mr. John Macgregor.

Chairman of Johnson & Phillips, Ltd.

Mr. J. A. Briscoe.—The death has occurred, at the age of 71, of Mr. James Arthur Briscoe, of Morecambe, who for 43 years was the chief electrician at Leeds University, retiring four years ago.

Mr. A. Grothe.—The death occurred on July 17th of Mr. August Grothe, of the firm of Messrs. A. Grothe & Sohne, Cologne, well known manufacturers of electric bells and accessories. Mr. Grothe was in his 84th year and right up to the end he was active in the business of which he was the founder and senior partner.

Wills.—Sir Benjamin Longbottom, M.I.E.E., the late joint managing director of Laurence Scott & Electromotors, Ltd., and chairman of the B.E.A.M.A. Council, who died on May 1st, left estate of the gross value of £25,607 (£19,179 net personalty).

The late **Mr. R. H. Selbie,** C.B.E., director and general manager of the Metropolitan Railway Company, left estate valued at £67,724 (£32,706 net personalty).

Mr. Ernst Horstmann, the late secretary and managing director of the Horstmann Gear Co., Ltd., Bath, left estate valued at £8,117 gross (£7,531 net personalty).

The late **Sir Alexander Gracie,** a director of the English Electric Co., Ltd., and Cammell, Laird & Co., Ltd., left, in addition to real estate, personal estate valued at £123,876.

The late **Mr. James W. Speight,** formerly managing director of the Ormskirk Electric Supply Co., Ltd., left £12,295 (£11,609 net personalty).

Financial Section.

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies' Dividend Changes, Transactions in Stocks and Shares.

New Companies Registered.

British Electric Refrigerator Co., Ltd.—Private company. Registered July 12th. Capital, £100 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in all kinds of electrical refrigerators, machinery and appliances, &c. The subscribers (each with one share) are: J. F. Stewart, secretary, and J. J. West, Crown House, Aldwych, W.C.2, sales executive. The first directors are to be appointed by the subscribers. Registered office: Crown House, Aldwych, W.C.2.

Bell Wireless & Motor Accessories Co., Ltd.—Private company. Registered July 12th. Capital, £300 in £1 shares. Objects: To adopt an agreement with A. G. Browne, G. H. Motion, and N. W. Packer, and to carry on the business of retailers, dealers in and manufacturers or repairers of wireless and electrical goods of all kinds, accumulator chargers, &c. The directors are: A. G. Browne, 35, Hogarth Road, S.W.5, wireless engineer; G. H. Motion, 16, Lower Common South, Putney, S.W.15, wireless engineer. Secretary: A. G. Browne. Registered office: 205, Uxbridge Road, Ealing, W.13.

Radio Distributing Co., Ltd.—Private company. Registered July 17th. Capital, £5,000 in £1 shares. Objects: To carry on the business of radio receiving, broadcasting and distributing, &c. The permanent directors are: J. King, "Strathdene," Church Road, Urmston, near Manchester (chairman); Dr. H. Bardsley, 14, Park Avenue, Southport; O. B. Kellett, 11, Allerton Road, Southport (managing director). Solicitors: Hervey Smith & Sons, Hyde.

R. B. Heckie & Co., Ltd.—Private company. Registered in Edinburgh July 15th. Capital, £4,000 in 2,000 10 per cent. cumulative preference and 2,000 ordinary shares of £1 each. Objects: To carry on the business of electricians, mechanical engineers, &c. The directors are: B. H. Heckie, 11-13, Commerce Street, Glasgow, C.5, engineer and machinery merchant; R. W. Mitchell, 25, Brownside Road, Cambuslang, merchant; A. Mitchell, 142, St. Vincent Street, Glasgow, C.A. Registered office: 11, Commerce Street, Glasgow, C.5.

Film Apparatus, Ltd.—Private company. Registered July 18th. Capital, £200 in £1 shares. Objects: To carry on the business of electricians, wireless, electrical, mechanical and general engineers and manufacturers, &c. The subscribers are: S. A. Coronel, 64, Gloucester Place, W.1, film agent; D. S. Paterson, 51, Perham Road, W.14, company director. Registered office: 20, Cork Street, Burlington Gardens, W.1.

Official Returns of Electrical Companies.

H. J. Cash & Co., Ltd.—Capital, £25,000 in £1 shares. Return dated March 11th, 1930. 15,650 shares taken up. £10,650 paid. £5,000 considered as paid. Mortgages and charges, nil.

Peter Raven & Co., Ltd.—A. W. Watson, of 5, Waterloo Street, Birmingham, ceased to act as receiver on July 7th, 1930.

E. Jeffery, Ltd.—Particulars filed of £75 debentures authorised July 1st, 1930, charged on the company's property, present and future, including uncalled capital, the whole amount being now issued.

Pullars Electric Co. (Brighton), Ltd.—Charge on 105a, Hollingbury Road, Brighton, dated July 1st, 1930, to secure £450. Holder: R. Kelsey, Flat 4, 4, Third Avenue, Hove.

City of Buenos Ayres Tramways Co. (1904), Ltd.—Capital, £1,240,000 in £5 shares. Return dated March 3rd, 1930. All shares taken up. £1,240,000 considered as paid. Mortgages and charges: £161,493.

Clarke, Chapman & Co., Ltd.—Capital, £550,000 in 7,000 preference shares of £10, and 480,000 ordinary shares of £1 each. Return dated March 7th, 1930. 6,985 preference and 456,560 ordinary shares taken up. £100,210 paid (being £10 per share on 4,435 preference, £1 per share on 55,360 ordinary, and 5s. per share on 2,000 ordinary). £426,200 considered as paid. Mortgages and charges, nil.

Gibrico Electric, Ltd.—Capital, £1,000 in £1 shares. Return dated December 31st, 1929 (filed February 28th, 1930). 800 shares taken up. £400 paid. £400 considered as paid. Mortgages and charges, nil.

Hindle, Son & Co., Ltd.—Capital, £15,000 in 10,000 ordinary and 5,000 deferred shares of £1 each. Return dated January 13th, 1930. 4,000 ordinary and 5,000 deferred shares taken up. £4,000 paid on the ordinary shares. £5,000 considered as paid on the deferred shares. Mortgages and charges, nil.

South Metropolitan Electric Tramways & Lighting Co., Ltd.—Capital, £500,000 in 200,000 preference and 300,000 ordinary shares of £1. Return dated March 13th, 1930. All shares taken up. £465,110 paid on 200,000 preference and 265,110 ordinary shares. £34,890 considered as paid on 34,890 ordinary shares. Mortgages and charges: £128,291.

Power Securities Corporation, Ltd.—Capital, £2,000,000 in 1,000,000 7 per cent. cumulative participating preference and 1,000,000 ordinary shares of £1 each. Return dated February 28th, 1930. 500,000 preference and 500,000 ordinary shares taken up. £1,000,000 paid. Mortgages and charges, nil.

Rushden & District Electric Supply Co., Ltd.—Issue on June 6th of £450, and on July 8th, 1930, of £5,050 debentures, parts of a series already registered.

Staffordshire Electrical Accessories Co., Ltd.—D. H. Bates, of 10, Cheapside, Hanley, Stoke-on-Trent, ceased to act as receiver on July 4th, 1930.

Aeonic Radio, Ltd.—C. J. G. Palmour, of 4B, Frederick's Place, Old Jewry, E.C.2, was appointed receiver and manager on June 27th, 1930, under powers contained in debentures dated February 26th and 28th, 1930.

Flexible Electric Cords, Ltd.—F. Kniveton, of 7B, London Road, Enfield, was appointed receiver and manager on July 5th, 1930 under powers contained in second debenture dated May 30th, 1929.

Charles White Electrical Co., Ltd.—Capital, £3,000 in 2,000 "A" and 1,000 "B" shares of £1 each. Return dated March 10th, 1930. 1,550 "A" and 1,000 "B" shares taken up. £1,050 paid. £1,500 considered as paid. Mortgages and charges, nil.

Crossley Brothers, Ltd.—Capital, £1,492,293 in 403,390 preference shares of £1, 1,015,414 ordinary shares of 10s., and 581,196 £1 shares unissued. Return dated March 10th, 1930. 403,390 preference and 1,015,414 ordinary shares taken up. £405,700 paid on 278,200 preference and 255,000 ordinary shares. £505,397 considered as paid on 125,190 preference and 760,414 ordinary shares. Mortgages and charges, nil.

Isle of Thanet Electric Supply Co., Ltd.—Capital, £500,000 in 282,000 6 per cent. preference, 150,000 ordinary, and 68,000 unissued shares of £1 each. Return dated March 26th, 1930. All the preference and ordinary shares taken up. £222,000 paid on 222,000 preference shares. £210,000 considered as paid on 60,000 preference and 150,000 ordinary shares. Mortgages and charges, £282,194.

West Cambrian Power Co., Ltd.—Satisfaction in full on May 27th, 1930, of debenture in favour of Barclay's Bank, Ltd., dated December 3rd, 1929, and registered December 6th, 1929. (According to the register of mortgages, the debenture registered December 6th, 1929, originally secured all moneys due or to become due from the company to the bank).

City Notes.

W. T. Henley's Telegraph Works Co., Ltd.

The annual meeting was held on July 18th, Sir George Sutton, Bt. (chairman), presiding. In moving the adoption of the report and accounts (ELECTRICAL REVIEW, July 11th, p. 70), the chairman, after referring with regret to the death of Mr. A. A. Campbell Swinton, said that the year under review had been a placid year of prosperity. The turnover of the business had neither gone up nor down in the total. Large contracts had been fewer and general trade had been greater. Markets for raw material had not plunged about wildly, and taxation had been steadily high. Foreign trade had decreased, but against that Dominion trade had increased. The numbers employed in their factories had risen by about 5 per cent. Machinery and plant had been maintained in efficiency out of revenue, and the whole cost of research work had been charged against revenue. Extensions to the buildings and plant at the works were always going on, but the capital account did not yet show any expenditure on account of an overseas factory which they were establishing in collaboration with other cable makers. He did not like manufacturing abroad; it might bring some profit to do so, but it was at the expense of employment for manufacturing at home. In this particular case, a high tariff against them would prevent them exporting, and so they must lose the home manufacture. Referring to the Henley Tyre and Rubber Co., the chairman said that it had been fully employed throughout the year and had maintained the money turnover, although lower selling prices had ruled. He had on former occasions given information in regard to their co-operation with other cable makers, and at the annual meeting last year he informed them that in many respects the co-operation was producing satisfactory results, but that after the two years' working they were not in smooth waters, and that endeavours to modify the agreements might have to be made. They had now worked under the arrangement for three complete years, and he would have liked to have been able to report that their difficulties had all been overcome. It might be that three years was not sufficient time to promote that close co-operation which was essential to the equitable and successful working of the arrangement as they expected it to work when they entered into it. There had been considerable help to the allied companies in meeting severe competition, but he was bound to say that their expectations as to the extent of that help had not been fully realised. In many other directions the co-operation was working smoothly and satisfactorily, but it was felt that the financial arrangements might be adjusted so as to bear more equitably than they did on each of the parties, and negotiations to modify the arrangements were proceeding at the present time. Something had already been achieved, and there was reason to hope that they were in a fair way to make the co-operation of these companies as useful to the electrical industry and to the individual companies as they had hoped at its inception. In proposing the re-election of Sir George Sutton as a director, Sir Montague Hughman said that next March Sir George would have completed 50 years' service with the company. The report and accounts were adopted.

Cables & Wireless, Ltd.

The first annual meeting was held on July 15th, Mr. J. C. Denison-Pender (governor and managing director) presiding. In presenting the report and accounts (ELECTRICAL REVIEW, July 11th, p. 71), the chairman said that the calling together of the Imperial Wireless & Cable Conference, which resulted in the formation of the merger companies, arose from the fact that the Post Office, as a result of its purchase from the Marconi Co. of the beam stations, was fast destroying the revenue of its own cables and of the Pacific Cable Board. The only solution of the problem was the bringing together under one control of all the telegraphic circuits of the Empire, whether cable or wireless. They were not prepared to accept the proposal that the Post Office should sell them the Imperial cables and the Home Government and the Dominion Governments should part with the Pacific Cable Board's cables to the merger, while the Post Office retained under its own control the Marconi beam stations. The Conference finally recommended that the merger should have transferred to it nearly all the telegraphic services operating from this country. The results of the communication business were disappointing. They had had the misfortune to run up against an unprecedented period of trade depression just at the moment when they were reorganising these world-wide telegraphic services. There was an intimate relationship between trade and telegraphic traffic, and 80 per cent. of their telegraphic revenue was in respect of commercial traffic. It was certain that with a revival in trade there would be a revival in telegraph revenues. The Communications Co. could carry two or three times the existing traffic without any appreciable increase of working expenses. The Communications Co. was taking active steps to maintain its position throughout the world, and had entered into active competition for the valuable traffic between this country and the United States. This service continued to develop satisfactorily, the traffic for 1929 showing an increase of 54.95 per cent. over 1928, and it had been further extended by the provision of two additional short-wave beam transmitters, which were now under construction for installation at the Ongar transmitting centre. Cables played an important part in world communications. Even to-day the great bulk of their revenue was derived from cable traffic. In regard to traffic revenue, they looked forward with confidence, because they had faith in the future of the British export trade and the prosperity of the British Empire. The energy and skill of our exporting manufacturers, and the unsurpassed quality of their products, must reap their reward as soon as world economic conditions showed an improvement. The report and accounts were adopted.

Petters, Ltd.

The accounts of this company were abstracted in our issue of July 11th, p. 70, and the annual meeting was held on July 15th. Sir Ernest W. Petter (chairman), who presided, said that the trade depression which had existed for so long, had become distinctly more marked since the beginning of the current financial year. The present fiscal situation in Australia, where they did a considerable business, was serious for the company, and was showing itself in a reduction of sales. The political situation in India was affecting sales, and similar circumstances had arisen in Argentina and in certain European countries. There was one bright spot in the growing appreciation that the British Empire offered the best hope for the improvement of our industrial situation, and the removal of unemployment, with its attendant evils, which had so long afflicted this country. Their Atomic Diesel engine was now being made in sizes up to 400 h.p. and had more than come up to expectations. During the year under review they had introduced a new automatic electric lighting plant, suitable for private houses, churches, public halls, and similar buildings, and for which they anticipated a considerable demand. Their aircraft works had been well employed during the year. The report and accounts were adopted.

Aron Electricity Meter, Ltd.

The annual meeting was held on July 14th, Mr. H. Kahn (chairman and managing director) presiding. In presenting the report and accounts (*vide* ELECTRICAL REVIEW, July 11th, p. 71), the chairman said that the balance sheet showed them to be in a strong position. Apart from the liquid assets, the London leasehold factory was to-day a most valuable asset, as it had been brought up-to-date in every way and equipped with the most modern plant and automatic machinery. The same applied to the Vienna factory. The year under review had been a difficult one, and had entailed an enormous amount of additional work on the part of the management without immediate results to show for their endeavours. As regarded the current year, the Austrian branch had made a considerable increase in its turnover, and had been working at a profit. The turnover of the London meter factory since the end of the year under review, had been practically maintained in spite of bad trade generally, while the Taximeter Co., owing to the greatly improved service now being given, was showing a gratifying influx of new contracts. The report and accounts were adopted.

Kalgoorlie Electric Tramways, Ltd.

Presiding at the annual meeting on July 15th, Mr. C. C. Baker (chairman) said that the traffic receipts for the year showed a decrease of £508, which was almost entirely due to the increase of motor-cars in the district. There was little doubt that for the remainder of the period of the concessions they would have to look forward to increased costs of maintenance, but everything would be done to save expenditure, and in this direction, they had removed the track, poles, &c., on the non-paying routes, and the material removed could be used for repairs on the other routes. With regard to their relations with employés, the Tramways Association had served them with a new log asking for altered working conditions, including a 44-hour week, and an increase in wages averaging 3s. per day. Their proposal that the men should continue to work under existing conditions for another six months was rejected, and they were now awaiting the decision of the State Arbitration Court. The report and accounts were adopted.

W. & T. Avery, Ltd.

The report for the year ended March 31st last shows a profit of £123,315, as compared with £117,257 in the preceding year, to which is added £54,328 brought forward, making £177,643. After deducting debenture interest, &c., it is proposed to pay a final dividend of 10 per cent., less tax, on the ordinary shares, making 15 per cent. for the year, leaving £59,035 to be carried forward. As a result of a settlement made with the Revenue authorities in respect of Dominion income tax, the ordinary shareholders are to receive a relief of 6d. in the £ on income tax in respect of the final dividend. It is proposed to increase the capital of the company from £1,000,000 to £1,250,000 by the creation of 250,000 shares of £1 each. The report states that no matters are under contemplation which would require the issue of any of this capital at the present time.

Marconi's Wireless Telegraph Co., Ltd.

When the Marconi Company's capital was acquired by Cables and Wireless, Ltd., a number of holders of the company's £1 ordinary shares refused to assent to the arrangement on the ground that the terms offered were inequitable. It is now announced that Cables and Wireless, Ltd., has made an offer to purchase these shares for £3 in cash, plus the dividend now payable. The dissenting shareholders' committee has recommended the acceptance of this offer.

Urban Electric Supply Co., Ltd.

A meeting has been called for to-day (Friday) to consider resolutions for the increasing of the company's capital to £1,050,000 by the creation of 250,000 ordinary shares of £1 each. Of these, 52,253 are required for the acquisition of not less than 90 per cent. of the share capital of each of the following companies:—The Bodmin Electric Light and Supply Co., the East Cornwall Electricity Supply Co., the Looe Electricity Co., the North Cornwall Ice and Cold Storage Co., the Wadebridge and District Electric Supply Co., and the Liskeard Gas and Electricity Co.

Czecho-Slovakian Company's Debenture Issue.

On Monday last the Skoda Works, the large Czecho-Slovakian engineering concern, whose products include electrical machinery, offered for public subscription in England £2,500,000 6 per cent. first mortgage sterling debentures at 95 per cent. (part of a series of £5,000,000). The company has paid the following dividends on its share capital during the past four years: 1926, 15⅝ per cent.; 1927, 17½ per cent.; 1928, 21⅞ per cent.; 1929, 28½ per cent. The prospectus stated that the proceeds of the issue "will replace some of the large capital expenditure of the company and will provide the additional working capital required by the company's rapidly extending business."

Whitehall Electric Investments, Ltd.

The gross income for the year ended March 31st last, amounted to £683,167 (against £517,106 for 1928-29), and the net income after providing for debenture interest, &c., is £449,883 (£292,193). A dividend of 5 per cent. is recommended on the ordinary shares, leaving £112,783 to be carried forward. Investments now stand at £4,456,092, while interests in subsidiaries total £4,473,337. The report states that since March last a substantial interest has been acquired in the electrical enterprises of Athens.

Falk, Stadelmann & Co., Ltd.

The report for the year ended March 31st last shows a profit of £107,495, as compared with £97,708 in 1928-29. To this is added £13,261 brought forward, making £120,756. From this £8,318 is transferred to income-tax reserve, 7½ per cent. is again to be paid on the ordinary shares, £10,000 is written off goodwill and £4,603 off patents, leaving £25,085 to be carried forward.

Chiswick Electricity Supply Corporation, Ltd.

In making their offer to shareholders to take up new shares at par in the ratio of one new share to each three held, the directors state that these shares will rank *pari passu* with the existing shares, but will not participate in the interim dividend which is being paid this month. Shareholders are given until July 28th to accept the offer. The proceeds of the issue are to be used to redeem the outstanding debentures.

British Columbia Electric Railway Co., Ltd.

The report for the year ended June 30th, 1929, shows a profit of £521,063, to which is added £182,228 brought in, making £703,311. After deducting debenture interest, &c., it is proposed to pay a final dividend at the rate of 3 per cent. on the deferred ordinary stock, making 8 per cent. for the year, leaving £184,257 to be carried forward.

Reduction of Capital.

FESCOL, LTD.—A petition presented to the High Court for the reduction of this company's capital from £55,000 to £31,250 is to be heard on July 28th.

South London Electric Supply Corporation, Ltd.

An interim dividend of 3 per cent. (same) has been declared on the ordinary shares.

County of London Electric Supply Co., Ltd.

An interim dividend of 3 per cent. (same), less tax, has been declared on the ordinary shares.

Swiss Company.

The report of *Brown, Boveri & Co.*, of Baden, which deals with the year ended with March 31st, 1930, states that the international crisis is beginning to extend and is making itself perceptible in keener competition and depressed prices. As a consequence the existence of independent subsidiary companies abroad has answered its purpose well. The workshops in Baden are at present still well occupied with long-term orders, but there has been a decline in the orders at the works in Munchenstein. Nevertheless, in the second half of the year remunerative orders of large extent were obtained. The net profits are returned at 5.32 million fr., as compared with 5.31 millions in 1928-29 and the dividend is maintained at 9 per cent.

Stocks and Shares.

TUESDAY EVENING.

THE sustained rise that has been for some time past the outstanding feature in gilt-edged securities, is threatened with reversal, by reason of an unexplained demand for gold by France. This demand proved sufficiently pressing to lead to speculations concerning the Bank Rate, the mere hint of a rise in which is enough to shake the prices and the nerves of the market in "money" stocks. Amongst the latter securities, those recently-issued in various electrical groups, have escaped depreciation. In fact, the new 5 per cent. debenture of the London Electric Railway is ⅜ better, at 1½ premium above the issue price of 97½.

New Issues.

Pirelli-General Cable Works 5½ per cent. guaranteed debenture is ¼ better at 101¼. There is a useful line of £10,000 of this stock on offer at the price mentioned, free of stamp and fee. Interest is payable on the first of January and July. A full half-year's interest will be due on New Year's Day next. Principal and interest are guaranteed by the General Electric Co., Ltd., and the Società Italiana Pirelli, Ltd.

Of the lately-issued Edmundsons' Electricity Corporation 5 per cent. debenture, £10,000 can be obtained about 93¾ and £10,000 Newcastle-upon-Tyne 5 per cent. consolidated debenture at 97¾, in both cases free of stamp and fee. The issue prices, it may be of service to recall, were 93½ and 96, respectively, and the underwriters had to take up rather more than half the total amount of stock offered by Edmundsons'. An apt illustration, by the way, of the fact that comparative failure of a public issue may turn out profitably for underwriters. The Skoda Works has offered 2½ million pounds of 6 per cent. first mortgage sterling debentures at 95.

Home Railway Stocks.

Prices of stocks and shares in the Home Railway section are well maintained as a whole, but Underground Electric ordinary eased off to 24s. This includes the 3 per cent. (actual) dividend due next month. Districts hold the rise they acquired last week. It is proposed to replace the present Warren Street station, on the Hampstead-Highgate Tube, by another station to be built near by. The estimated cost of the new station is £250,000. The Underground Electric Railways of London can legitimately claim to be doing its full share towards the provision of employment. Metropolitan ordinary stock is up 1½ to 67½ upon early anticipation of an increase in the dividend; last year's rate was 4 per cent., as against 3½ per cent. paid for 1928. The company's prior-charge stocks are also in request.

Urban Electric.

On Friday in this week shareholders in the Urban Electric Supply Company are to meet to approve an increase in the capital to £1,050,000 by the creation of 250,000 new ordinary shares of £1 each. Of these new shares, it is proposed to apply 52,253 towards the acquisition of not less than 90 per cent. in each of six companies operating in Cornwall. The balance of 197,747 new ordinary shares will remain at the disposal of the directors. The Urban Company is in its 33rd year of existence, and supplies electricity to a number of widely-separated places. The present price of the shares is 32s. 6d., unaffected by the new proposals. The company has been paying dividends of 7 per cent. on the ordinary shares, and the yield at this rate, and at the present price, is the modest amount of £4 6s. 2d. per cent. on the money.

Electricity Supply.

Depressed industrial conditions do not make much difference to the progress of the electrical undertakings which operate in the northern area. The Yorkshire Electric Power Co. is paying 6 per cent. per annum interim, and the Electrical Distribution of Yorkshire 9 per cent. per annum on the ordinary shares, these being the same as the dividends of a year ago. The companies' announcements were given, on p. 111, in last week's ELECTRICAL REVIEW. Yorkshire electrics are quoted at 32s., and Electrical Distribution of Yorkshire at 34s. 9d. No changes have occurred in the prices of the London companies' shares. Scottish Electric Power new shares stand at 1½d. discount. Isle of Thanet ordinary and preference are 26s. 6d. and 23s., respectively; Richmond (Surrey) 42s., Egham and Staines 31s. 3d., and Northants 44s. 6d.

Cables and Wireless.

Nothing has happened since the meeting of Cables and Wireless, on July 15th, to energise the market in the stocks. The result has been to leave prices without material change. It is recognised that for any marked recovery to take place in the merger's traffics, trade conditions must first give signs of improvement. That the company ought to be able to meet the 5½ per cent. dividend on the preference stock is generally agreed, although the profit at present being earned allows but little over by way of margin. The position of the "A" stock is no better than that of a speculative holding at present dividendless; the "B" stock is a frank gamble on future prospects. It seems clear that the Government entertains no present intention of bringing pressure to bear upon the Post Office with a view to co-operation with Cables and Wireless.

Marconi.

Those holders of £1 shares in Marconi's who declined to convert into Cables and Wireless are gleeful at the unexpected twist of events that has brought them an offer of £3 for each of their shares. It is officially announced that two of the largest groups that own the outstanding £1 shares in the Marconi Company have agreed to accept this cash offer, which applies to the £1 ordinary and the participating preference shares alike. At to-day's prices of the Cables and Wireless stocks that were originally offered (and accepted by the majority of Marconi proprietors) the equivalent price of a Marconi £1 share would be about 33s. The offer, therefore, of £3 in money is handsome; it is not often that a "nuisance value" is appraised so highly. Nevertheless, the interests that have hitherto fought against any alteration being made in the character of the shares may still refuse to yield unanimous consent to the latest proposal.

Telegraphs and Telephones.

Globe Telegraph & Trust ordinary shares have fallen 10s. to 16. Perhaps it might be possible to buy them at 15½, for anticipation hardly looks to see the 10 per cent. tax-free dividend maintained much longer, in the face of the Cables and Wireless results. The preference shares remain at 10¾, giving a return on the money of rather over 5½ per cent. Anglo-American Telegraph preferred has failed to recover from its two-point fall of last week. Oriental Telephone shares have weakened to 2-11/16. Chadburn's Ship Telegraph ordinary are 3s. 3d., and the preference 11s. 3d., the latter showing a slight decline. American Telephone & Telegraph gained nearly 10 points, with a jump to 227½, after which the price fell back to 220. International Telephone & Telegraph is ½ lower at 47½; Anglo-Portuguese Telephones are unchanged at 20s. 3d.; Cable Telegraph & General Trust 7 per cent. preference keep at 20s. 6d. Hall's Telephone Accessories hold their gain at 14s. 9d. ex dividend. Telephone Rentals, at 3s. 6d., are also ex dividend, and Telephone Manufacturing (1929) remain at about ninepence.

A New Australian Company.

Whitehall Electric Investments announces that, owing to the provisions of the new Companies Act, the proposal to convert the Whitehall preference shares into redeemable shares cannot be carried out. The company is doing well, and has raised its previous dividend of 2 per cent. to 5 per cent. for last year. To the former, however, there was attached a bonus of 18 per cent.—arising from special conditions—and this is not repeated. The 7½ per cent. preference, at 24s. 6d., pay 6¼ per cent. on the money.

The British Thomson-Houston Co., the G.E.C. (London), and the Phillips Co., of Holland, are concerned in the formation of an Australian company that intends to acquire the Australian General Electric factory at Newcastle, New South Wales. Negotiations towards this end have been in progress for some time past, and are said to be nearly concluded.

Equipment and other Companies.

Sir George Sutton's speech, at the annual meeting of Henley's Telegraph Works, contained sage counsel on the subject of hard work. He admitted, in regard to his own company, that expectations previously formed of the help likely to be received from allied companies in meeting severe competition, had not been fully realised. Modification of the financial arrangements were proceeding, however, and Sir George held out hopes of the co-operation being as useful as it was originally intended to become. Henleys are firm at 6½. Siemens have risen to 22s. 6d. English Electrics are lower at 15s. and 11s. 3d. for the ordinary and preference, respectively. Brush ordinary has been put down 3½ points, to 116½. Prices in the iron, coal, and steel market show a reactionary tendency. Babcocks, at 55s., have lost their gain of a week ago. Vickers are better, at 7s. 6d. Rubber is now at the lowest price recorded, and the rubber share market is as despondent as its prices are dull.

Dollar Stocks.

American and other dollar stocks have been a falling market, showing little power of resistance to sales of stock by tired holders. Shawinigans are exceptional, with a rise to 69½, and Power Corporation of Canada shares remain at 70½. British Columbia Power weakened to 38 and 15¾ for "A" and "B," respectively. Mexico Tramways first debentures are 2½ down at 59. Brazilian Tractions drooped to 40¼, Hydro-Electrics to 39¾. International Holdings are neglected at 4⅛. Puebla Trams. continue to be accumulated by a New York group, and are quoted at 30, the supply coming principally from Swiss holders. Radio Corporations, after meteoric movements, are 41⅛. A fall of 4 points lowered Pennsylvania Water & Power to 76½. Canadian General Electric preferred hardened to 64, San Paulo first mortgage bonds to 87½.

Anglo-Argentine Tramways' Fall.

Fresh flatness attacked the Anglo-Argentine Tramways group, and the second preference, at £2, are 5s. down. The first preference have given way to 2-5/16; the 5 per cent. debenture stock is again a point lower, at 63½. Apprehension is expressed in regard to the outlook for the company. Lisbon Tramway ordinary, at 21s. 6d., are slightly easier. In the Indian group, the only quotable change is 1/16 decline, to 32s. 6d., in Delhi Electric Supply & Traction shares.

Share List of Electrical Companies.

HOME ELECTRICITY COMPANIES.

	Nom.	Approx. Dividend. 1928.	1929.	Price July 22 1930.	Rise or fall	Yield p.c.
	£					
Bournemouth and Poole	1	15	15	57/6	—	5 4 3
Brompton Ordinary	1	8½	8½	26/6	—	5 5 8
Charing Cross Ordinary	1	8½	8½	28/-	—	5 0 0
do. do. 4½% Pref. ...	1	4½	4½	18/-	—	5 0 0
Chelsea	1	8⅞	8⅞	26/6	—	5 5 8
City of London	1	10	10	38/9	—	4 3 1
do. do. 6% Pref....	1	6	6	23/-	—	5 4 4
Clyde Valley	1	8	8	38/3	—	4 3 9
County of London	1	7	10	4*/9	—	4 7 4
do. do. 6% Pref.... ...	1	6	6	23/-	—	5 4 4
Edmundson's 7% Pref.	1	7	7	24/-	—	5 16 8
Elec. Supply Corporation	1	11	11	48/3	—	4 11 3
Kensington Ordinary	1	8	8	27/-	—	5 3 8
Lancs. Light and Power	1	7½	7	25/-	—	5 12 0
London Electric	1	8½	9	29/6	—	4 15 0
Metropolitan	1	9	10	40/-	—	5 1 8
do. 4½% Pref.	1	4½	4½	17/-	—	5 6 0
Midland Counties	1	6½	7	27/6	—	5 1 10
Mid. Elec. Power	1	15	8	32/-	—	5 0 0
Newcastle-on-Tyne Ordinary ...	1	6	6	23/9	—	5 1 1
do. 7% Pref.	1	7	7	26/-	—	5 7 8
Notting Hill 6% Pref.	10	6	6	10⅞	—	5 11 4
North Met. Elec. 6% Pref.... ...	1	6	6	22/6	—	5 5 9
St. James' and Pall Mall	1	8	8	28/-	—	5 0 0
Scottish Power	1	8	8	28/-	—	5 14 4
South London	1	8½	8½	27/6	—	5 1 10
Urban Ordinary	1	7	7	32/6	—	4 6 2
Westminster Ordinary	1	8⅛	8⅛	27/-	—	5 3 8
Whitehall Elec. Invst. 7½% Pref....	1	7½	7½	24/6	—	6 2 5
Yorkshire Elec.	1	8	8	32/-	—	5 0 0

HOME RAILS.

Central London Ord. Assented ...	Stock	4	4	77	—	5 4 0
Metropolitan	,,	3½	4	67½	+1½	5 18 6
do. District	,,	4	5	78	—	6 8 2
Underground Electric	£1	7	8	24/-	—6d.	6 13 4
do. do. Income ...	Bonds	6	6	105	—	5 14 8

TELEGRAPHS AND TELEPHONES

Anglo-Am. Tel. Pref.	Stock	6	6	100½	—	5 19 4
do. Def.	,,	1½	1½	24	—	6 5 0
Automatic Telephone	1	10	12½	35/-	—	7 2 10
Cables & Wireless 5½ Pref.... ...	Stock	—	5½	77½	—	7 2 0
do. A 7½ Ord.	,,	—	—	25½	—	... ...
do. B Ord.	,,	—	—	12½	—	... ...
Globe Tel. and T. Ord.	10	10	10	16	—½	*6 5 0
do. do. Pref.	10	6	6	10⅜	—	5 11 7
Great Northern Tel.	10	20	20	29	—	6 18 0
Marconi-Marine	1	12½	15	1⅛	—	7 14 10
Oriental Telephone Ord.	1	12	12	53/9	—1/16	*4 9 8

HOME AND FOREIGN TRAMS, &c.

Anglo-Arg. Trams First Pref. ...	5	5½	5½	2 1/16	—⅛	11 17 8
do. do. 2nd Pref. ...	5	6	6	2	—¼	15 0 0
do. do. 5% Deb. ...	Stock	5	5	68½	- 1	7 17 6
British Electric Traction Def. Ord.	,,	5	5	152/6	--	... ...
do. do. Pref. Ord.	,,	8	8	123½	—	6 6 6
Brazil Traction	100	7	8	40½	—1	4 18 9
Brit. Columbia Elec. Rly. Pce. ...	Stock	5	5	91½	—	5 9 8
London & Sub. Trac. 5% Pref. ...	1	Nil	Nil	9/-	—	... ...
London United Tram Deb. ...	Stock	4	4	50½	—	7 18 4
Mexico Trams, 5% Bonds	—	5	5	59	—2½	8 9 8
Mexican Light Common	100	Nil	Nil	71½	—	... ...
do. 7% Pref.	100	7	7	76½	—	9 3 0
do. 1st Bonds	—	5	5	81	—	6 5 0
Victoria Falls Ord.	1	15	15	3⅝	—	4 18 6
Yorkshire (West Riding)		Nil	Nil	5/-	—	... ...

MANUFACTURING COMPANIES.

Assoc. Elec. Ord.	1	6	6	25/-	—	4 16 0
Babcock & Wilcox	1	13	15	55/-	—9d.	*5 9 1
British Aluminium Ord.	1	10	10	40/-	—	5 0 0
British Elec. Transformer Pref. ...	1	7	7	8/9	—	... ...
British Insulated Ord.	1	15	15	8⅜	—	4 0 0
Brush Ord.	Stock	10	10	116½	—3½	8 11 8
Callenders	1	15	15	3 1/16	—	4 4 0
do. 6½% Pref.	1	6½	6½	23/9	—	5 9 5
Crompton Parkinson Ord.	5/-	—	30	23/9	—	6 5 4
do. 8% Pref.	1	8	8	25/9	—	6 4 3
Edison-Swan 1st. Pref.	1	7½	7½	24/6	—	7 1 2
do. 5% Deb.	Stock	5	5	84½	—	5 18 4
Electric Construction	1	5½	5	12/-	—	8 6 8
Enfield Cable Ord.	1	20	20	4½	—	4 14 1
English Electric	1	Nil	Nil	15/-	—1/16	... ...
do. do. Pref. ...	1	8	Nil	1 1/8	—1/16	... ...
Gen. Elec. Pref.	1	6½	6½	24/3	—	5 10 7
do. Ord.	1	10	14	50/-	—9d.	5 12 0
Henley	1	25	30	6½	—	5 0 0
do. 4½% Pref.	5	4½	4½	4½	—	5 6 0
India-Rubber	1	Nil	Nil	7/6	—	... ...
Johnson & Phillips	1	10	10	1⅝	—	5 6 8
Siemens Ord.	1	7½	7½	22/6	+1/16	6 13 4
Telegraph Construction	12	10	10	18½	—	*5 7 6

* Dividends paid free of Income Tax.

Our Foreign Electrical Trade.

Electrical Exports and Imports during June.

THE Board of Trade returns for June show that there was a general decrease in our overseas trade in which electrical goods and machinery shared. It will be seen from our table that electrical exports declined by £260,651 as compared with May. This substantial fall must be attributed to a large extent to the vagaries of the calendar. This year June had five Sundays, while May had four, and it included the Whitsun holiday; last year Whitsun fell in May. There was only one increase—£20,711 in the case of batteries and accumulators; apart from this every item was smaller than in May. Owing largely to a considerable fall in submarine cable exports, the telegraph and telephone section showed a total decrease of £141,163. Exports of machinery, as a whole, declined by £91,563. The greatest fall in the general section was recorded against insulated wires and cables—£35,397. As compared with June last year, the decrease in the total was negligible when the incidence of Whitsun is taken into account. There were, however, some large variations in the individual items. While the telegraph and telephone section showed an overall decline of £69,298 and the machinery section one of £13,314, there were substantial increases in batteries and accumulators (£28,913), glow lamps (£15,932), and insulated wires and cables (£11,792).

There was a greater proportional decrease in imports during June, and, as compared with May, only one increase occurred—that of £240 in the case of arc lamps and parts. The principal decrease was one of £41,334 in the machinery section; telegraph and telephone cables and apparatus fell by £29,501; meters and instruments by £16,073; and insulated wires and cables by £13,361. The decline of £52,557 from the June, 1929, figure was mainly due to a fall of £68,343 in imports of telegraph and telephone apparatus; imports of batteries and accumulators, and insulated wires and cables were also much smaller. Against these the figures for meters and instruments and glow lamps were considerably higher.

Although the re-exports declined from the May figure, they were £13,854 in excess of the total for June last year; this section showed the greatest proportional advance during the first half of the current year—122 per cent. Imports have risen by 28 per cent. and exports by only 0.35 per cent.

The inset table gives details, by weight and value, of the distribution of our electrical machinery exports during June. The fall in price levels is again apparent; while the weight of the exports advanced by over 12 per cent. as compared with the corresponding month of last year, the value declined by 2.7 per cent. The decline in the shipments of electrical machinery to India, Japan, and Australia continued during June, but, on the other hand, European and South American countries, New Zealand, and Canada again took more. During the first half of the year electrical machinery exports advanced by £38,764, while exports of goods and apparatus were lower by £6,189.

Destination.	Quantities. Tons. June, 1929.	Tons. June, 1930.	Tons. Inc. or dec.	Values. £ June, 1929.	£ June, 1930.	£ Inc. or dec.
Europe	658	1,108	+450	132,385	166,048	+33,663
Japan	28	10	− 18	5,973	2,790	− 3,183
South America ...	175	239	+ 64	31,235	40,708	+ 9,473
South Africa ...	234	201	− 33	41,206	27,990	−13,216
British India ...	625	389	−236	103,540	63,787	−39,753
Australia	551	208	−343	71,954	33,674	−38,280
New Zealand ...	81	404	+323	11,212	41,016	+29,804
Canada	142	282	+140	19,698	38,713	+19,015
Other countries ...	465	485	+ 20	79,695	68,858	−10,837
Totals ...	2,959	3,326	+367	£496,898	£483,584	−£13,314

	Exports. Electrical exports for June, 1930.	Inc. or dec. as compared with May, 1930.	Inc. or dec. as compared with June, 1929.	Imports. Electrical imports for June, 1930.	Inc. or dec. as compared with May, 1930.	Inc. or dec. as compared with June, 1929.	Re-Exports. Electrical re-exports for June, 1930.	Inc. or dec. as compared with May, 1930.	Inc. or dec. as compared with June, 1929.
Electrical goods and apparatus (unenumerated)	£229,487	− £2,447	+ £4,193	£123,900	− £16,461	− £12,852	£7,312	+ £116	+ £633
Insulated wires and cables ...	225,689	− 35,397	+ 11,792	62,462	− 13,361	− 9,392	656	+ 338	+ 526
Glow lamps	63,599	− 632	+ 15,932	26,312	− 4,265	+ 13,828	882	+ 449	+ 410
Arc lamps and parts	1,275	− 1,157	+ 826	1,697	+ 240	+ 613	18	− 136	− 206
Batteries and accumulators ...	93,341	+ 20,711	+ 28,913	38,418	− 12,803	− 17,373	1,782	+ 1,558	+ 314
Meters and instruments ...	24,631	− 6,701	− 5,980	101,279	− 16,073	+ 32,556	12,846	+ 10,083	+ 11,981
Carbons	521	− 1,760	− 1,610	13,524	− 1,120	− 738	16	− 44	− 182
Switchboards (not telegraph or telephone)	5,279	− 542	+ 2,463	90	− 16	− 149	—	—	—
Electrical Machinery—									
Electrical machinery (unenumerated)	315,010	− 31,214	+ 11,446	115,755	− 41,334	+ 8,850	11,946	− 2,423	− 1,070
Railway and tramway motors	5,532	− 14,998	− 11,429	—	—	—	—	—	—
Other motors and generators...	163,042	− 45,351	− 13,331	—	—	—	—	—	—
Telegraph and Telephone Cable and Material—									
Telegraph and telephone wires and cable (not submarine)	55,391	− 47,057	− 39,214	2,673	− 2,900	+ 443	—	—	—
Submarine telegraph and telephone cable	17,674	− 59,271	+ 13,629	—	—	—	—	—	—
Telegraph and telephone instruments and apparatus ...	157,198	− 31,835	− 43,713	53,481	− 26,601	− 68,343	8,055	− 29,928	+ 1,448
Totals...	£1,357,669	−£260,651	− £26,083	£569,591	− £134,693	− £52,557	£43,513	−£19,987	+£13,854
Increases for first six months of 1930			Exports £32,573			Imports £965,176			Re-Exports £186,477

The World Power Conference.

The Second Plenary Meeting held at Berlin.

By OUR SPECIAL COMMISSIONER.

No. 5.*—*Continuation of extracts from, and comments on, selected papers of electrical interest submitted and discussed by delegates.*

Co-operation in Power Production.

The paper by Mr. E. Cesari (Italy) describes co-operation, but different in character from that discussed last week. In 1928 some 98 per cent. of the power consumed in Italy was produced by hydro-electric stations, and, owing to the varying conditions of the sources of supply of water, co-operation amongst the various stations is given close attention with a view to utilising the water reserves to the best possible advantage. Contrary to what one has been led to expect from other sources, the author states that Italy is not really very rich in water sources suitable for power purposes; the majority, or at least the majority of the economical sources, has already been harnessed, with the result that the remaining sources are becoming more and more expensive to harness, although no comparative figures are given. This has given rise to the necessity of establishing thermal stations, technically necessary owing to the need of supplying power during unusually dry or even drought periods, and economically necessary owing to the prohibitive capital cost of new hydraulic stations.

Italian conditions are not altogether similar to any other conditions normally met with in Europe. The total loads are comparatively small and the conditions of supply are such that it is not expedient to invest large sums of money in order to obtain doubtful overall super-thermal efficiencies. A further condition peculiar to the country is the variability of the type of fuel obtained.

The author describes a chain of six thermal stations which operate in conjunction with a large number of hydro-electric stations over a very scattered area. A reflection of the peculiar fuel conditions prevailing is shown by the fact that in those stations the boilers are equipped for burning either solid coal, pulverised coal, or oil, which appears to be not only a set back from the efficiency point of view, but also a considerable disadvantage from the point of view of initial capital cost. Although it is not mentioned in the paper, one of the causes of this excess of precaution from the fuel-supply standpoint is understood to be partly due to the consequences of the general strike of 1926, when the shortage of fuel became very acute over a somewhat lengthy period.

The paper presented by Mr. N. E. Funk (U.S.A.) deals with the same question as the last author (Italy), but under a very different set of conditions. In common with many American papers, the study is very largely a statistical one. The basic example given is the Conewingo station and from experience, statistics, and curves obtained from this plant the author gives a detailed study of the economics of plant of this type, from which he draws certain conclusions with respect to the expediency of building thermal stations whose capacity is a function of the general load factor. The paper also contains a series of figures comparing the capital costs of steam and hydro-electric stations, and from these the annual capital charges are given for a series of different load factors.

* For Nos. 1, 2, 3 and 4 of this series see ELEC. REV., June 27th, July 4th, 11th, and 18th, 1930.

Electric Traction.

In the section devoted to traction thirteen papers were presented in connection with electrically-operated railways. Considering those which deal with electrification properly speaking as a whole, it seems as though much more development may be expected in the near future in America than in Europe, partially governed by finance and traffic conditions in the two Continents. The two American papers on electric traction deal with electrification from the economic aspect. It is of interest to note that in spite of the longer distances and smaller road development per square mile of territory in America, motor transport is making itself felt as a rail competitor.

In his paper on the economics of electric traction for trunk-line railways Mr. W. D. BEARCE gives statistics showing the considerable savings that have been effected by the electrification of certain lines, and that increases in traffic have followed the change of system. The conclusion he draws is that the results have proved so satisfactory that in all probability electrification in America will be carried out at a much faster rate than in the past.

Mr. G. Gibbs (U.S.A.) treats the subject in a similar way, but perhaps from a slightly different angle. In this case the author analyses the American traffic conditions on steam-operated railways and shows the advantages of electric traction from the locomotive characteristic point of view. Here, again, competition by road vehicles is mentioned, and again increases of traffic are shown subsequent to electrification.

On the other hand, European contributions, or at least those that deal with the overall economic aspect of the subject, strike rather a different note.

The paper presented by Mr. H. Parodi on the development of railway electrification in France is fairly representative of conditions generally obtaining in Europe as a whole. The author reviews electrification progress in various countries and studies the causes that are responsible for the general slowness of extension. Perhaps the most important cause mentioned is the fact that the electrification of existing steam-operated railways involves an expenditure amounting to an increase of capital outlay of from 25 to 30 per cent. On the other side of the balance sheet, electrification may reduce running costs by from 20 to 25 per cent. only. These are the cold figures put forward, and they do not pretend to take into account certain advantages which are derived from electrification, but which cannot be expressed in mathematical units.

The paper continues with a study of the various systems in use, and in this respect is particularly interesting. Direct current and a.c. single-phase systems are discussed, but not in the light of a direct *versus* single-phase controversy. Other papers touch upon this question also, and it is by no means agreed whether greater advantages can be gained from the one system or the other. This and other papers show a distinct tendency to treat the electrification problem as a whole, not only from a purely traction point of view, but also from the general aspect of the supply and distribution of electricity for industrial and traction purposes. Here,

again, opinion is not unanimous, particularly in those cases in which alternating current is favoured for traction purposes. The chief difficulty in this respect is the question of compromising between the most suitable frequency for traction purposes and that for industrial purposes, or, again, in the choice of the number of phases. This problem has given rise to an interesting proposal, put forward by Dr. Jacob, of Stuttgart, to transmit single-phase and three-phase a.c. by means of the same feeders.

The other papers deal mainly either with local conditions or particular problems. One paper (Dr. Reichel, Germany) describes attempts that are being made to transmit alternating current to locomotives and motor coaches fitted with mercury-arc rectifiers and direct-current motors. The problem, in fact, appears to be in a more or less stationary state; the best form of current for traction motors is direct current, whereas the best form of current for transmission is alternating current. Development centres around the possibility of utilising both to give the best economic results over the whole.

Canal Towage.

One paper in this section is devoted to a rather unusual form of electric traction. It describes some installations that have been carried out in France for electrical towage on canals. The difficulties that have been encountered are outlined, and the paper also describes the tractors in use and the methods employed in designing and maintaining the track.

The "Italian Hour."

The "Italian Hour" was devoted to a lecture by Professor G. Vallauri on "Electricity and Energy." After dealing with many mechanical analogies to the transmission of electrical energy, Prof. Vallauri brings us back to the ideas of Lord Kelvin on the conception of a singular form of energy, which can be called polarisation energy.

If an analogy to mechanical phenomena is possible, we can imagine that this polarisation energy as being something similar to the energy stored up in every element of an elastic body which is deformed by the influence of mechanical power. This similarity also exists owing to the fact that polarisation energy can be taken back completely on decreasing the field which, if the medium possesses electricity, can be called magnetic elasticity.

To the layman and even to the technician, when contemplating overhead transmission over an open stretch of country, it is difficult to realise that the energy moves from one place to the other without having had any temporary existence in between, and without having taken on any definite value at any part of the intervening space at any moment. Considering Maxwell's theory, we can imagine that the whole of the space surrounding the line is filled with and polarised by an electro-magnetic field, and is carrying energy whose line of direction is parallel to the direction of the wire. In other words, if an observer is placed in a certain plane, he will notice that energy flows through every point of the plane with increasing intensity as the point of observation in the plane approaches the conductor.

It is only through the wires themselves that no useful conveyance of energy takes place; the energy, therefore, is spread out in the whole of the space, with the exception of that occupied by the conductors. The function of the wires is, therefore, comparable to a track along which the energy runs, but it cannot be compared with a pipe through which the energy flows. A current runs through the wire and its energy is lost for practical purposes. The energy is, so to speak, hurled into the conductors from the outside electromagnetic field, and is converted into heat energy, which represents a loss whenever energy is conveyed by wires.

This theory, if expanded, explains to a very large extent certain phenomena of the transmission of radio-telegraphic energy in proximity to the earth's surface. So far, however, we have found no means of conveyance of energy in large amounts by this method without considerable losses, but no one can say if the day will some time come when the whole of space will be permeated with an electromagnetic field from which we can draw the energy required, in the same way that we draw from the atmosphere the air we breathe.

There do exist in the atmosphere several forms of electrical energy which may contain a remarkable number of watts, but, as they contain but a small number of joules, it is impossible to convert them to any industrial use. In the same way, if electrochemical transformation on a large scale, in which the chemical potential energy of other materials, especially that of fuels, could be carried out in practice, the situation would be somewhat changed.

Thus it seems that Nature, in the same way as it supplies no electrical energy which can be obtained direct, with the exception of very small quantities, is also not in a position to absorb it again in large quantities. It is man who has discovered the means of generating large quantities of electrical energy, and man will also have to discover some means of storing it in sufficient quantities.

The greatest fault of electricity is that it cannot be stored in large quantities without being transformed for the purpose. The cause of this difficulty is that electrical and magnetic polarisation energy only has a very small volume density, even with the most intensive fields that can be produced to-day. The greatest value of this form of energy depends on its capacity for travelling as exceedingly high rates. This explains how it is possible to convey enormous blocks of electrical energy in spite of the very small volume density of the energy, but this advantage becomes illusory if the main question is that of the storage of energy. Other expedients for storage have been found, such as the storage of water in artificial lakes, and the small efficiency and high cost of these methods clearly show what difficulties are attached to the problem.

Transmission Networks.

In the section on the transmission and flow of energy in single and multiple connected networks, the first paper deals with the control of generating-station loads and the regulation of frequency and voltage on a large interconnected system, and describes in detail the technical measures adopted in the U.S.A. for the joint operation of several independent electricity supply undertakings under the control of a holding company.

In this case the installed generator capacity is about 1.3 million kVA, with a maximum demand of approximately 575,000 kW. The area covered is about 570 miles long and 330 miles broad; transmission being mainly carried out over 110,000-volt lines. The paper describes the sectional organisation of the control stations, and one point of interest is that there are two main load-dispatching centres and a regional dispatching office for each district. The relations between individual companies are not controlled in detail by the holding company, and the supply contracts which are arranged are not necessarily strictly adhered to, sufficient elasticity being allowed for alteration according to the circumstances of varying load.

Voltage regulation is carried out mainly by the production of wattless kVA, as shown by the installation of phase advancers of a total installed capacity of 140,000 kVA. Frequency regulation is effected by synchronometers, and sufficient accuracy of frequency regulation is obtained by additional double-frequency changers. Special steps are taken to limit short-circuit capacity, and attempts are being made to keep it down to 1.5 million kW by means of tie lines between adjacent generating stations fitted with high- and low-voltage reactors.

Paper No. 97 on the British grid system and its relation to certain technical and economic problems, presented by Sir A. Page and Mr. C. W. Marshall, deals mainly with the special conditions in England which have permitted the development of a power system on uniform lines and is now too well known to require further explanation.

Train-testing Equipment.

Some particulars of the apparatus developed by Messrs. Everett, Edgcumbe & Co., Ltd., for the India State Railways.

AMONGST the many advantages secured by the use of electric power for traction purposes, by no means the least valuable is the ease and accuracy with which the electrical quantities involved can be measured and recorded. Full advantage has been taken of this in the dynamometer car recently completed by the Metropolitan Cammell-Carriage Company for the India State Railways. In addition to the usual mechanical measurements, such as draw-bar pull, acceleration, speed, &c., a very complete electrical equipment for indicating, recording and integrating the current, power and voltage has been designed and supplied by Messrs. Everett, Edgcumbe & Co., Ltd. This equipment possesses several novel features, so that a brief description of it will be of interest.

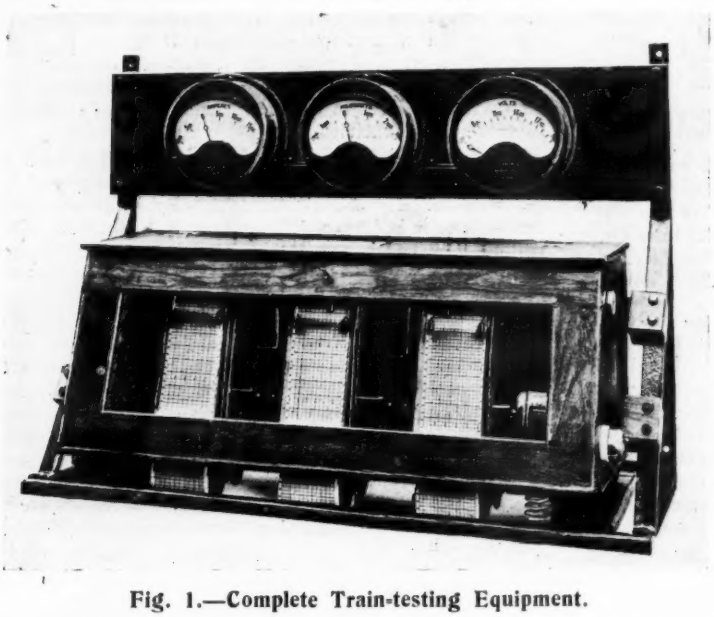

Fig. 1.—Complete Train-testing Equipment.

The conditions inseparable from railway working differ so widely from those met with in ordinary power and lighting supply practice that all idea of using the conventional graphic instrument had to be abandoned. The paper speeds called for in these equipments are usually very high, and in the present instance they are three in number, namely, 2 in., 10 in., and 60 in. per minute. For such high speeds, the usual spring-driven clockwork mechanism is useless. Another important point is the vibration and jolting to which the graphers are subjected, as well as the sudden changes of train speed, due to acceleration or braking. They are such that any form of directly-operated inking arrangement is useless. Moreover, in this particular case, it was desired to supplement the indications and graphic records by integrating the various quantities; that is to say, the equipment had to measure ampere-hours, kilowatt-hours, &c. As the result of extended experience with a similar set, the "Everett-Edgcumbe" relay-operated train-testing equipment, embodying a large number of additions and refinements to meet the exacting requirements of the engineers, was adopted by the India State Railways.

The principle of operation of the inking mechanism is indicated in fig. 3, and is roughly as follows: the moving coil actuating movement is shown at H, and any increase or decrease in the quantity measured causes the contact M to close on to K_1 or K_2, as the case may be. This energises the corresponding electro-magnet E_1 or E_2, thereby pulling the leather-rimmed wheel C against one or other of the disks D_1 or D_2, which disks are kept in continuous rotation by the motor. As a result, the worm F rotates, carrying the toothed sector G with it, in such a direction as to follow the movement of the coil H until it has, as it were, "caught it up," and thus caused the contact at M to be broken. In this way, the movement of the inking pen L is so controlled that its position corresponds exactly with the deflection of the sector G, and therefore of the measuring element H. A view of the mechanism removed from the case is shown in fig. 4, from which the construction of the various parts will be clearly seen.

The complete equipment is shown in fig. 1, and with the case opened in fig. 2. The motor on the right drives the charts, thus ensuring the absolute synchronism of all three; at the same time it actuates the three recording pens. An important advantage of the continuously rotating motor drive lies in the rapidity with which the pens follow every change in the quantity measured; in fact, a sudden change from zero to the maximum causes the pen to travel right across the chart, which is 4 in. wide, in less than 1½ sec., tracing a clear line all the way. The change-speed gears, which are shown on the left of fig. 2, are arranged to give three chart speeds of 2 in., 10 in., and 60 in. per minute, respectively. Alternatively, they allow the charts to be driven from the wheels of the car, the chart speed being then proportional to that of the car.

Constancy in the speed of the chart, whether driven at 2 in., 10 in., or 60 in. per minute, is ensured by the provision of a sensitive centrifugal governor attached to the motor shaft; this is shown at A in fig. 3. The speed is practically independent of the voltage applied to the motor; in fact, a rise or fall of 25 per cent. will only alter the speed by about ½ per cent.

An auxiliary pen, which makes a definite mark on each chart at fixed intervals, in response to current-impulses transmitted from a separate contact-making clock, provides a check upon the speed markings on the chart. Moreover, when the chart is driven from the car wheels the auxiliary pen enables the speed of the car to be at once determined. A further set of three auxiliary pens, operated by means of an external press knob, serves to make a mark on each chart at any moment, so as to record the occurrence of some event which it is desired to note; for example, the passing of a station, the application of the brakes, or the commencement or end of a steep gradient, &c. The chart passes over a platform placed at a convenient angle, so that pencil notes may be made upon it as it passes through the grapher, 18 inches of each chart being always visible.

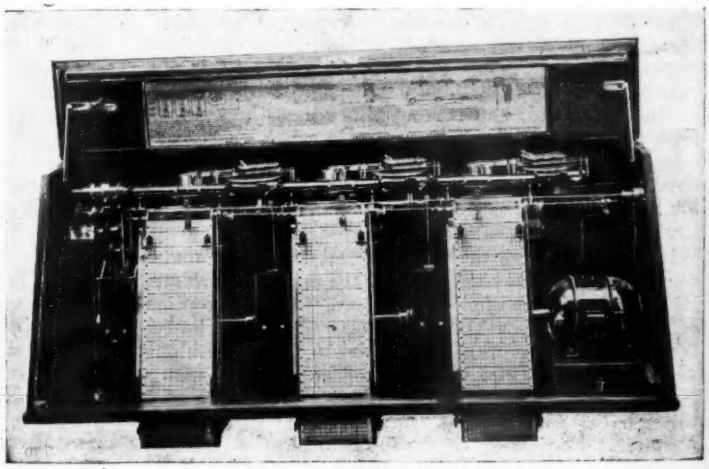

Fig. 2.—The Graphers, showing Driving Arrangements.

An ingenious integrating attachment, due originally to a

suggestion made by Dr. C. V. Drysdale, is provided for each movement and is shown in fig. 3, as well as in fig. 2. The horizontal disk P is driven at constant speed by the motor, and upon it rests the planimeter wheel Q, geared to the cyclometer dials S. Since the disk P is driven at a constant speed, it is clear that the number of revolutions made by Q, and consequently by the dials, depends upon the radial position of Q upon the disk; that is to say, its speed is directly proportional to its distance from the centre. The carriage with the

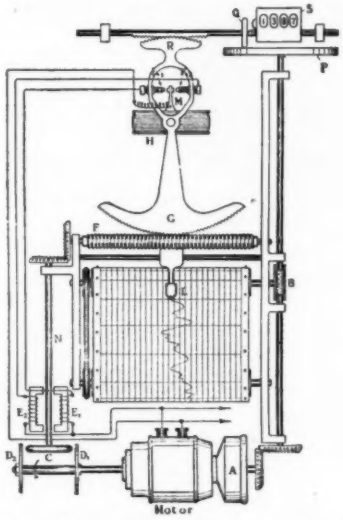

Fig. 3.—Operating Principle of Inking Mechanism.

wheel Q and the dials S runs on guides, and is moved in and out by means of the worm F through the quadrants G and R, so that the distance of Q from the centre always corresponds with the distance of the pen L from the zero point; in other words, it is always proportional to the quantity measured, *e.g.*, kilowatts, and consequently the dials S will register kilowatt-hours, &c. For many purposes it may be desired to determine the average value of the integrated quantity over a specified length of run, and this is readily done by dividing the integrator reading by the time.

Fig. 1 shows the equipment complete with indicating instruments and mounted in its special anti-vibration frame. This frame, which is arranged for attachment to the side of the car and carries the graphic instrument, is suspended by springs and protected from the effects of vibration by blocks of spongy rubber under compression. As will be seen from fig. 2, the used chart passes out below the case and can be withdrawn

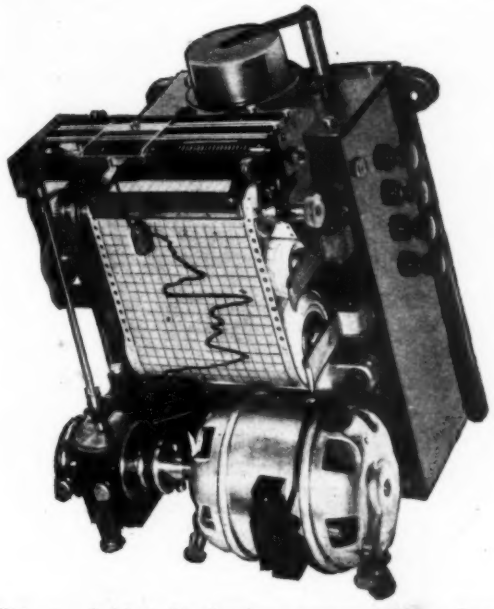

Fig. 4.—Inking Mechanism removed from Case.

at any time, during a run if desired, without in any way disturbing the equipment.

Lack of space prevents the reproduction of actual records, but the fact that the equipment described is practically a duplicate of one supplied several years ago to the same railway is sufficient to show that the value of the information obtained has fully justified the comparatively large expenditure involved in the purchase of another equipment.

Portishead Power Station.

An Account of the Civic Visit to the New Capital Station of Bristol Corporation.

AUGUST, 1893, marked the installation of a 52-kW Willans-Siemens set at the Temple Back Station of the Bristol Corporation Electricity Department; July 15th, 1930, witnessed, *inter alia*, the inauguration of a 50,000-kW turbo

Fig. 1.—Sir A. Duncan, the Sheriff, the Lord Mayor, Mr. H. Faraday Proctor, and Sir A. Page.

Fig. 2.—Visitors arriving by charabanc at Portishead.

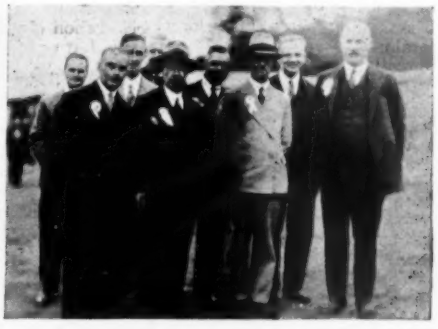

Fig. 3.—A Group of Stewards and Members of the Staff.

generator at the Portishead generating station of the same municipality. The latter event indicated the progress made in the production of generating units, and at the same time showing the remarkable progress made in 37 years by the Bristol Corporation as an Electricity Supply Authority. A description of the lay-out and equipment of the Portishead station has already appeared in our issues of March 14th and 21st, 1930.

The members of the Bristol Town Council paid a civic visit of inspection on Tuesday, July 15th, in order that through them the citizens might become more fully acquainted with their

valuable possession. Sir Andrew Duncan, Sir Archibald Page, and Sir Felix Pole were the distinguished guests of the Lord Mayor, who, before an audience of nearly a thousand, epitomised the history of the Bristol undertaking and directed attention to the impetus which the Portishead station was bound to give to the industries of Bristol, for, said the **Lord Mayor,** the whole object of the scheme was to generate at a figure that would enable the Electrical Committee to supply at low rates, which in turn would tend to minimise the cost of various productions.

Fig. 4.—Mr. T. A. Pedler (Mains Engineer).

Fig. 5.—Mr. H. Faraday Proctor

Fig. 6.—Former Colleagues, Messrs. P. F. Crinks and A. J. Ostler.

Sir Andrew Duncan said the Central Electricity Board was engaged in a great commercial enterprise and a great mission of stimulus and endeavour in electrical development. He, in company with Sir Archibald Page, had visited practically every undertaking in the country and the closest possible contact had been established. He paid Bristol no idle or formal compliment when he said there was no electrical centre in the country which offered the Board more encouragement than it would receive in Bristol. He was not surprised that Bristol should be the really pivotal point in the South-West Scheme. He believed overhead lines to be essential factors of the scheme and hoped there would be co-operation from every corporation and all the county councils.

Sir Archibald Page described the Portishead station as an example of British engineering at its very best. Anyone who might have doubts of the necessity of such stations would have them dispersed if he took a trip to America or the Continent. He had done so recently and his opinion was stronger than ever. The grouping and interconnecting of generating stations was the essence of the Central Board's activities and they could only be fully effective if in each group there existed a modern and highly efficient generating station on which the base load of the system could be concentrated. For the South-West scheme Bristol with its foresight had filled the gap. It had fallen to his lot to prospect for sites for generating stations in the South-West England and South Wales districts, and without wearying them with specifications he could say very authoritatively and definitely that such sites were not so easily obtained or obvious as many people thought. This fact accentuated Bristol's accomplishment and made it all the more noteworthy. Portishead was a great achievement and in keeping with the fine history of the Bristol electricity undertaking and worthy of all concerned—the Corporation, the engineers, and the contractors. Such an asset should be taken full advantage of, and the way to assist that was for the Corporation and the Electricity Board to co-operate to the fullest possible extent in order to arrive at that conclusion. What appealed most to him and to all of them was that Portishead was the coping stone of Mr. Faraday Proctor's life work. It was proper in every way and in the fullest sense, and they who held him in high esteem and affection, rejoiced in that knowledge. All wished him long years still of health and happiness in which to enjoy his great success.

Councillor J. H. Inskip said the Central Board was in the fortunate position of not being paralysed by Parliamentary control. He could only say that it was a pleasure to work with the Board, and so long as they were engaged in working this station they would be in the closest association with it. He could promise that the Corporation would use its best endeavour to make its association with the Board profitable. The Central Board owed much to the driving force of its chairman. To Mr. Faraday Proctor the highest praise must be given. The whole of this scheme had been prepared and carried out by the officers of the electricity department. They had done something far beyond their normal duties. It had already been said that Portishead was the coping stone of Mr. Faraday Proctor's life work. Mr. Proctor had been with them right from the very start of the electricity undertaking, and he was very sorry to think that he was due for retirement during the next year or two. He could imagine no happier conclusion to his work than to see that station, for which he was in so large a measure responsible, standing there at the close of his career. He thanked Sir Andrew Duncan and Sir Archibald Page for coming down to encourage them to continue their efforts.

Mr. H. Faraday Proctor expressed his appreciation of the very kind references to himself, and said that he was but the figure-head of the officers of the electricity department; the majority of the work had of necessity fallen upon the members of his staff, to whom he was very grateful. The work would have been commenced in 1925, but they were held up by an Act of Parliament until 1926, when they started operations. He expressed his gratitude to the Electricity Commissioners, and also to the Bristol Corporation, which within one month of the time when they as engineers had selected the site, sanctioned the expenditure of £1,000,000, although it did not know all the details of the scheme.

The arrangements for the comfort of visitors were admirable, and the tour of the generating station was easy of accomplishment, due to the very clear indication of the routes by poster. Such indication rendered the attendance of personal guides unnecessary and enabled a choice of routes to be made depending on the physical fitness of the guest. The spacious marquee was very tastefully decorated, and loud-speaker amplification enabled the speeches to be distinctly heard. The Bristol City Police Band discoursed popular music during the tea interval and prior to the speeches. The sub-committee, to whom the arrangements were entrusted, comprising Messrs. A. J. Newman (deputy engineer), A. J. Ostler, Willis, Irlam, and Hardie, under the supervision of Mr. H. Faraday Proctor, must feel highly gratified at the results they obtained.

Large Gas Engines.

The two 6,600-kW gas engines recently installed in the South Chicago works of the Illinois Steel Company are said by *Power* to be the largest ever built. The engines are of the four-stroke-cycle, double-acting, twin-tandem type, each having four 60×64-in. cylinders, operating at 83¼ r.p.m., and driving generators. They operate on blast furnace gas. The total length of the connected engine parts under working stresses is about 60 ft. Provision is made for lateral expansion and elastic stretch along the centre line of each side of the engine by anchoring the main frames to the foundation and by supporting the tie pieces and the tail guides on cast-iron columns designed to flex in the direction of elongation and contraction produced by the power impulses.

Compressed air at 200 lb. gauge is piped to each air starting valve, and the supply is under control of a single throttle valve for each pair of tandem cylinders. Notwithstanding the large masses to be accelerated, it requires less than two minutes to start one of the units, bring it up to speed, synchronise it, and have it carrying its share of the station load. Although required frequently to carry peak loads 20 per cent. in excess of the normal rating, "flooding" does not occur at any load, because of the throttled admission of the gas. The size of the engines will perhaps be appreciated from the fact that each unit weighs nearly 2,000 tons, and required forty 50-ton cars to transport it, and that at maximum load one engine consumes about 1,000,000 cu. ft. of gas per hour.

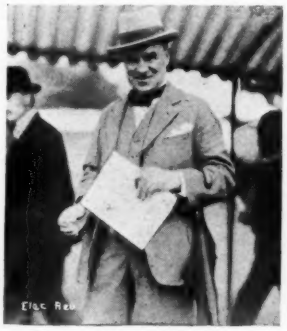

Fig. 7.—Mr. John Christie, of Brighton.

Fig. 8.—"The Selectors," Sir Archibald Page & Sir Andrew Duncan.

New Electrical Devices, Fittings, and Plant.

Readers are invited to submit particulars of new or improved devices and apparatus for publication in this section.

The "Self-protected" X-ray Tube.

The "Protexray" X-ray tube which was shown by Mr. CUTHBERT ANDREWS, 47, Red Lion Street, High Holborn, W.C.1, at the British Institute of Radiology in May, 1929, is described in a brochure which has just been published by Mr. Andrews. The instrument is of the "self-protected"

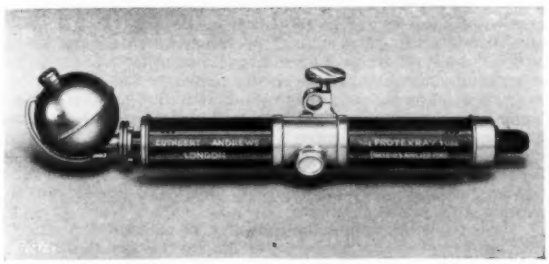

Fig. 1.—The "Protexray" X-ray Tube.

type, that is to say, it is furnished with a jacket of lead which surrounds the active zone of the tube and prevents the emission of X-rays, except by way of the working aperture. The thickness of the lead protection amounts in all to over 3.5 mm., which is largely in excess of that proposed in the International Recommendations on X-ray Protection. The active chamber of the tube, which is, of course, of glass, is enclosed (fig. 1) with its lead sheath in a cylindrical casing carrying the necessary terminals and the fitting for attaching the tube to the main part of the X-ray equipment. The anticathode, which is tungsten faced, is cooled either by a finned radiator or by the inclusion of a water reservoir. No enclosing boxes or shields are used with this type of tube. The instrument operates with a heated filament consisting of a straight coil, which gives the so-called "line-focus" effect. Three models of "Protexray" tube are now in production—3 kW, 6 kW, and 10 kW, all designed for radiographic work at voltages up to 80 kV (r.m.s.). The device for clamping the tube to its supporting stand is of special interest. While allowing of immediate adjustment in any direction, the tube may be rigidly fixed in any position by a slight turn of one milled head. The tube is made throughout in Mr. Andrews' own workshops and is claimed to be the only self-protected tube of British manufacture, and, with the exception of certain types of the original Coolidge tube, the only hot-cathode X-ray tube of any kind ever made in the British Empire. It is interesting to learn that some of the first "Protexray" tubes completed were supplied to the War Office, which has made exhaustive and prolonged tests of the tube.

Cast Name Plates.

Messrs. MCLEOD & MCLEOD, 329, High Holborn, London, W.C.1, announce the introduction by them of cast name plates in "Ezett metal" (white bronze and zinc bronze) and red metal (bronze). These plates have a very fine appearance and can be manufactured in practically any shape or form up to 37 ft. 6 in. long by 24 ft. 6 in. wide. While the "Ezett" metal type is cheaper, it cannot be curved or bent, but the red metal type can be delivered curved, bent, or domed. An advantage of these plates is that there are no tool costs, except when the order is very small, such as for 10 to 20 plates, and when the plates are required bent or curved. The "Ezett" metal plates are delivered with a matt ground, whereas the red metal plates have a polished ground.

New Moulded Accessories.

The latest products of the moulding department of the EDISON SWAN ELECTRIC CO., LTD., 123-5, Queen Victoria Street, E.C.4, are lampholders and wall plugs and sockets made of B.T.H. "Fabrolite" compound. In the design of the lampholders every step has been taken to ensure safety in handling and simplicity in wiring, and to safeguard against the possibility of short circuit. The terminals are separated by a deep dividing fillet integral with the lampholder body. The appearance is decidedly neat and pleasing, and the colour is a rich brown. The contact plungers are identical with those of the company's Admiralty and standard types of lampholders, but a recent modification is the adoption of a resilient phosphor-bronze spring as an additional safeguard against atmospheric action. "Fabrolite" shade carrier rings are supplied to suit standard shades having 1½-in. dia. holes, the rings being heavily knurled to facilitate fixing, and similar skirts are supplied in lieu of shade rings when lamp caps are required to be entirely shrouded. Cord-grip holders are provided with two leading-in holes in the dividing fillet through which standard or workshop flexibles pass to their respective terminals. No separate cord grip is necessary, as, when the nipple dome is screwed down on to the body, the flexible is effectively clamped without unduly straining the casing of the lampholder. Also included in the range are screwed nipple holders which have an inside flange at the termination of the thread to serve the dual purpose of limiting the entry of the tubing and of acting as a bush to prevent chafing of the wiring on the tube edge. The base of the nipple is formed so as to register rigidly with the lampholder body, thereby preventing the body twisting whilst the clamping ring is being tightened up.

The "Fabrolite" wall plugs and sockets are claimed to comply fully with the Home Office and I.E.E. regulations, and they are manufactured in accordance with the latest B.E.S.A specifications, the only exception being in the case of the 5-A non-handshield plug, in which in all other respects than the handshield top, B.E.S.A. requirements are complied with; complete interchangeability of plugs and sockets is thus assured. All the current-carrying parts are of ample dimensions, and designed to ensure perfect fit between pins and socket contacts. Flush-type socket plates are integral with the socket covers. The accessories are easy to wire, and neat and compact in design. The standard finish is dark brown. Other features of these appliances are: side entry for flexible conductors with efficient cord-grip, a combination that eliminates strain on conductors and reduces risk of short-circuit to a minimum; one-piece slotted pins, machined from solid brass rod, and one-piece socket contacts made from extruded metal, and provided with self-aligning features; socket bases of high-glazed English vitreous porcelain; a longer earth pin ensures that earth connection is made before and broken after

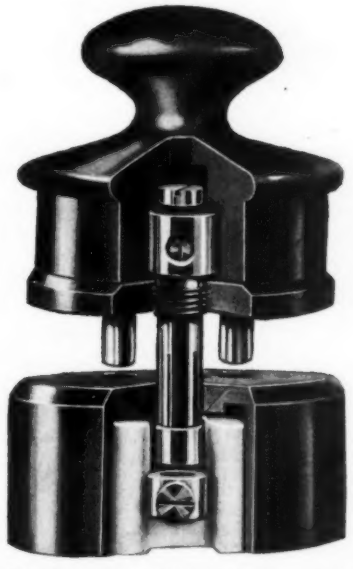

Fig. 2.—Construction of "Fabrolite" Wall Plug and Socket.

the circuit connection; the size of the earth pin makes it impossible for connection to be wrongly made; earthing terminals in both plug and socket are exposed.

The plugs and sockets are obtainable in the 2-pin surface and flush types and in the 3-pin surface type, all in 5- and 15-A sizes. Fig. 2 depicts the construction of a complete plug and socket.

Transatlantic Electrical Development.

A report of the impressions, chiefly with regard to electricity supply commercial methods, received during a tour of the United States of America and Canada.

A LUNCHEON was held last Friday at the Holborn Restaurant, London, in honour of Lieut.-Col. W. A. VIGNOLES and Mr. H. T. YOUNG on the occasion of their return from their Transatlantic visit.

Mr. HOWARD MARRYAT, chairman of E.D.A., presided, and in an address of welcome expressed the view that the two guests should not be expected to give detailed accounts of their investigations on that occasion, and suggested that they should relate some of the personal incidents of their journey.

This suggestion was, to some extent, carried out, but there was matter in the replies of both travellers of more than personal interest. We first of all give some extracts from the notes upon which the director of E.D.A. based his address.

"There are probably fundamental differences in the way in which business is regarded here and in the States, and the principal one seems to be that the idea of giving service to the customer is highly developed in America. There staffs are provided to seek and wait upon the consumer, and it rarely happens that a member of the public has to wait to be attended to. No one in the States waits for people to buy; the whole time they set out to sell and to create a demand for their products. Probably, on the other hand, the American public is more receptive to selling efforts than the British public, but we can usefully lay to heart the American method of giving as much attention to the scheme for selling products as to the design of the plant for making them. The companies spend large sums of money in giving service to their customers and helping them in every possible way. The staffs for this purpose are so large that one might anticipate that the cost of electricity to the consumer would be high, but electricity in the United States is not expensive. The maximum price per kWh paid in residential districts appears to be from 3½d. to 5d., and as money in the U.S.A. is worth less than in this country, this is a low price for a flat rate for lighting.

"The great majority of undertakings in the United States have been built up on the basis of using overhead lines, and of getting the consumer connected up in the cheapest possible manner. In providing these lines an effort is made to look forward for a period of ten years, but it is obvious that a great deal of reconstruction work has to be carried out, when development is rapid, before the expiration of this period, and considerable sums have to be allowed in the annual budget for this purpose. Cities like Toronto carry out the whole of their distribution by overhead lines, the extra high pressure feeders only being under ground, whilst in Washington the centre of the city only is supplied by underground distributing mains.

"The great bulk of the supply of electricity in the United States is in the hands of public utility companies, which are not subject to purchase by the local authority or State, but which, on the other hand, are controlled and regulated by a State Commission. These Commissions can and do fix tariffs, approve the issue of securities by the company, and generally supervise the finances and management. Their decisions are, however, subject to appeal to the Courts; this right of appeal is exercised and decisions of various Commissions have been rescinded in some cases. Numerous 'groups' and 'holding companies' have been formed with a view to providing the necessary credit and capital for the great developments that have been carried out. The holding company is sometimes a financing company only, but more usually it also manages the business of the company whose capital it is holding. One holding company has twelve main subsidiaries and about eighty other companies subsidiary to these main groups. The whole operate in over four thousand communities in parts of about twenty different States, mostly small townships. The population covered is about six and a half millions, the output amounting to over four thousand million kWh in the year 1929, or nearly half as much as the total kWh generated by public undertakings in Great Britain.

"The magnitude of the industry may be gauged by the fact that the new construction work in the year 1930 is estimated to amount to £200,000,000 (Great Britain £30,000,000 in 1928-29). Some three years ago a resolution was passed by the Senate that the Federal Trade Board should consider whether the utility companies should be subject to Federal control in addition to control by the State Commissions. This agitation appears to be one of the principal reasons why the utility companies of America have adopted a very energetic development policy. In this they have been encouraged by the National Electric Light Association, which has taken the view that if the companies serve the public well, and the public are made to realise that they are receiving good service, the companies can have nothing to fear from any inquiry.

"The National Electric Light Association, which in its early years devoted the greater part of its energy to engineering problems, now devotes a large proportion of its efforts to encouraging the existing undertakings to give good service to the public, and to develop new uses for electricity, and to informing the public as to what is being done for them by the utility companies. About 98 per cent. of the company undertakings are members of the Association. The N.E.L.A. Convention included four general sessions and special sessions dealing with accounting engineering, commercial methods, public relations, and public policy. The Convention was in some ways disappointing, as, although the addresses and papers were good, no discussions were allowed, so that one had to rely on chance conversations with other delegates to discover if the papers really represented the general opinion of the industry. Undertakings in America may be grouped in three classes:—(1) Undertakings connected with gas interests. (2) Coal-fired stations not connected with gas. (3) Hydro-electric undertakings.

"There is, however, no uniformity of policy even among undertakings of a class, as far as tariffs are concerned, although perhaps one could distinguish policies as to the loads to be developed. Perhaps the most striking feature in this connection is a negative one—that no undertaking of any class that I came across, not even a hydro undertaking, is encouraging room heating by electricity. In some hydro undertakings small bowl fires are allowed, but the use of electricity as the principal means of heating a home is definitely discouraged. The reason given is that the load factor of a heating load is not high enough, even in Canada, while the severe winter weather and the high temperature, 70 deg. F., at which Americans like to maintain their houses must handicap electrical heating. Refrigeration is being pushed by all undertakings, and is being developed even in undertakings like the New York Edison Co., where the first, and only, price for electricity in a small household is 3½d. per kWh.

"Commercial cooking has been developed by a number of undertakings, including some connected with gas interests, at prices apparently as high as 1.5d. per kWh. Domestic cooking is definitely discouraged by some undertakings in class (1); a few stations in class (2), such as Detroit, have recently started to encourage it on a 1.25d. rate, while the development of cooking in most hydro-electric undertakings is extensive, especially in Canada For instance, at Windsor, a municipal undertaking, receiving bulk supply from Niagara through the Ontario Hydro-Electric Commission, there are over 11,200 cooking ranges in use in an undertaking with a total of 18,000 meters in use for all purposes. A large amount of other apparatus is in use, with the result that in 1929 the average kWh consumed per domestic customer was no less than 2,304 per annum, while the total domestic sales in the area, the population of which is 70,031, amounted to almost 35 million at an average price of 1.6 cents per kWh.

"The most striking feature, however, of development in America, especially the U.S.A., is the extent to which the idea of good lighting has been "sold," and the large amount of electricity used for this purpose. This has been brought about by the employment by each supply undertaking of a staff of engineers trained as specialists in lighting, whose advice is available to all consumers. By constant personal touch with the consumers, the general level of lighting has been raised substantially.

"This great development, together with the connection of nearly 100 per cent. of available customers, appears to have brought with it a high load factor; anyway, many undertakings are operating with load factors between 40 and 50 per cent., while the *average* for the whole country is over 45 per cent. (31 per cent. in Great Britain). The extensive use of electricity for lighting has been developed in undertakings with very different tariffs, some where the "block tariff" only is used, and others, as at Chicago, where reduction in price below the top rate is always related to an increase in the consumer's load factor.

"This extended use of electricity for lighting, together with the demand for ironing, small appliances, and refrigeration, has brought the average demand per residential consumer up to 502 kWh per annum; as over 20 million households (68 per cent. of the total) are supplied with electricity, this figure represents a total output of over 10,000 million kWh.

"This great development has evidently been brought about by intense personal salesmanship, aided by advertisement and all kinds of propaganda. Sales departments are in the charge of competent engineers with an ample staff of specialists dealing with different applications of electricity. In one under-

taking the cost of the sales organisation amounts to 2 per cent. of the gross revenue, and the average consumption per meter is 4,000 kWh per annum. This expenditure appears to be well justified, as another company in a somewhat similar area spending only 0.7 per cent. on its sales organisation is selling only 1,700 kWh per meter per annum.

"In Great Britain the only general co-operative development work is that carried out by E.D.A., but in the U.S.A. such work is carried out to some extent by the N.E.L.A., while the whole of the activities of the Society of Electrical Development, the various electrical leagues, and the recently founded Lighting Service Bureau in Chicago are devoted to co-operative propaganda work.

"The N.E.L.A., which is now devoting most of its attention to commercial development and publicity work of some sort, is spending annually about £200,000, while it is estimated that a similar sum is spent in the aggregate by the Society of Electrical Development and the 35 active leagues, so that about £400,000 is being spent on co-operative propaganda work, while, as indicated, very large sums are spent by sales departments of supply undertakings.

"The financial crisis of last autumn caused a big slump in business. There is no doubt that there is considerable overproduction in many industries, and that it is going to be very difficult to find an outlet for the manufacturing capacity at present available. This reacts on the supply undertakings, which have already experienced a big drop in output for power purposes; Detroit, for instance, at the moment has lost 30 per cent. of its power load. There is a considerable increase in the demand for electricity for domestic and commercial purposes, but it is anticipated that the aggregate sales for the whole country in 1930 will show some reduction as compared with 1929.

"We saw signs of a wish on the part of thinking people in America to get away from the use of highly standardised products in their homes, and in American stores articles suitable for presents are frequently marked "British made" or "Made in France." With engineering products the case is, of course, different, and owing to the handicap of the tariff it would be difficult for British manufacturers to secure a footing in the United States market unless for some special product.

"I was fortunate enough to see the British High Commissioner in Ottawa, Sir William Clark, and he impressed on me the desirability of British firms cultivating the Canadian market by means of allied Canadian companies, who would assemble the goods, or would make some small portion, if it was only the packing case, in Canada, so that Canadian sympathy could be enlisted. He is strongly impressed by the energy with which the United States' manufacturers have turned their sales efforts towards the Canadian market since the wave of depression passed over their own country. Canadians, however, are anxious first of all to obtain Canadian goods, but failing this would much prefer to buy from Britain."

Mr. Young, in his remarks, first of all cleared up any misapprehension there might have been as to his having gone abroad officially on behalf of E.D.A. He thought they would require some time in which to digest and place in its proper perspective all that they had seen and heard in their six weeks' tour, during which they had visited some 20 public utilities. He had been greatly impressed by the vigour and energy of Americans, who were undoubtedly amazing workers with highly trained mentalities. They started their mental training early in life, and trained rather for business than for development of character; yet the latter seemed to look after itself quite well. In this country there were unquestionably the brains to train. Another thing that impressed him favourably was the total disregard for trade secrecy; full details of any business were readily obtainable.

Legal.

Notts. and Derbyshire Company Fined.

AT Newark on July 16th the Nottinghamshire Magistrates heard a summons arising out of a fatality which occurred recently at Kelham, when Father Francis, a priest, climbed a steel mast, carrying a power line belonging to the Notts. and Derbyshire Electric Co. and received a fatal electric shock. Proceedings were instituted by the Public Prosecutor against the company for failing to have a "danger" notice attached to the mast, and also for failing to take steps to prevent unauthorised climbing of the mast.

Mr. F. WALLACE, on behalf of the company, pleaded "guilty" on the first summons, but "not guilty" with regard to the second. It was stated in evidence that the mast in question was 70 ft. high and stood on a concrete bed, it being supported by four stay wires on either side. The stay wires were wrapped in single barbed wire for a distance of 9 or 10 ft. from the ground, but on the mast itself there was nothing to prevent a person from climbing. As a matter of fact there were steel bolts at regular intervals, commencing about 15 in. from the ground which formed a side ladder to the top. After the fatality the bottom bolts were removed and two "danger" signals had been added.

A student at Kelham College, with which the deceased was connected, said that four of the five of his companions had climbed the mast with ease. An assistant mains engineer to the company, said that he inspected the line on May 15th. There was then a "danger" notice affixed to the pylon, and he told the contractor he did not think it was large enough. There was nothing in the regulations governing the size of the notice. He was surprised to learn that there was no notice and that the barbed wire had been removed from the struts when the fatality occurred. Counsel for the prosecution read a letter from the company in which it was stated that the danger notice had not been fixed, but the witness could not explain that, saying that he was away ill at the time the letter was sent. The company was fined £5 upon each summons.

Imprisonment for Patent Infringement.

IN the Chancery Division, on July 18th, Mr. Justice Farwell heard a motion to commit Arthur Hickson Gower, Shepherd's Bush Grove, W., for breach of an injunction restraining him from infringing one of the British Thomson-Houston Co.'s patents for electric lamps.

Mr. GOWER said he had never intentionally bought or sold infringing lamps, but if he had done so inadvertently he expressed his regret.

After defendant's cross-examination, his Lordship said it did not seem that the defendant had done anything to prevent his employés from selling infringing lamps.

Mr. TREVOR WATSON, K.C., for the plaintiffs, said while they did not want to be vindictive, there was a widespread belief among people like the defendant that with care the Court's order could be evaded. There was a big trade in infringing lamps, and the plaintiffs' present method was the only way to stop it.

His LORDSHIP made an order committing Gower to prison, and to pay the costs.

Parliamentary News.

[By Our Special Parliamentary Reporter.]

World Electrical Exports.

On July 14th, Mr. W. R. SMITH, Parliamentary Secretary to the Board of Trade, told Mr. Simon that the total value of the domestic exports of electrical machinery and apparatus from the principal exporting countries during the years 1925 and 1929 were as follows:—

	1925. £'000.	1929. £'000.
United Kingdom	17,369	19,507
United States	17,091	26,975
* Germany	17,759	30,771
France	3,913	3,746
Switzerland	2,407	3,514
Sweden	1,998	3,511
Austria	1,717	2,513
Netherlands	2,647	10,352
Italy	603	999
Canada	602	998
Japan	550	1,179

* Including deliveries on account of Reparations.

Conversions from the original currencies into sterling had been made at the mean quoted rates of exchange in respect of 1925, and at the approximate par rates for 1929, except that in the case of Japan the conversion for 1929 had been made at the mean quoted rate. The figures for 1929 were provisional.

Rugby Wireless Station Revenue.

On July 15th, Mr. LEES-SMITH, Postmaster-General, informed Sir N. Grattan-Doyle that the actual figures in respect of the revenue and expenditure of the services conducted by the Rugby wireless station for the financial year 1929-30 were not yet available. The approximate figures were as follows: Revenue, £222,000; expenditure, £208,000.

Co-ordination of London's Electricity Supply.

On July 16th, Mr. D. G. SOMERVILLE asked the Minister of Transport if he could state by what date it was anticipated the electricity supply of the London area would be co-ordinated; and whether any calculations had been made as to the price at which it would be possible to supply electricity in this area after co-ordination had been carried through.

Mr. MORRISON said that the London area was included in the area of the South-East England Electricity Scheme, and the comprehensive co-ordination of the generation of electricity in the London area was dependent upon the completion of that scheme as a whole. It was anticipated that the scheme

would be completed in 1933. Partial co-ordination of generation in the area covered by this scheme would, however, be in operation before that time. Calculations of the price at which it would be possible for authorised undertakers to obtain supplies of electricity in bulk from the Central Board after the scheme had been completed were made by the Electricity Commissioners when framing the scheme, and were embodied in the volume of Supplementary Particulars published with the draft scheme in October, 1927. The relation between those prices and the prices to be charged to consumers could not at present be calculated.

The Liverpool Street Scheme.

On July 16th, Sir K. WOOD asked the Minister of Transport whether any progress had recently been made with the Liverpool Street Station scheme.

Mr. MORRISON said he was informed by the London and North-Eastern Railway Company that it was not yet in a position to make any further announcement in reference to this scheme.

An " Underground " Breakdown.

On July 16th, Mr. HARRIS asked the Minister of Transport whether, in view of the stoppage of the Underground service on July 14th, caused by a breakdown at Lots Road power station, he would say whether the Underground Electric Railway system was linked up with other power stations in the Metropolitan area; and, if not, whether anything was being done to secure such linking-up in order to prevent the inconvenience to the travelling public of such a stoppage.

Mr. MORRISON said that as regarded the first part of the question, he understood that the Underground Electric Railway system was linked up with the Neasden power station. He was in communication with the railway companies with regard to the point raised in the second part of the question.

Correspondence.

Correspondents should forward their communications **as early as possible.** *No letter can be published unless we have the writer's name and address in our possession.*

Domestic Water Heating.

Many pious hopes are expressed *re* the development of water heating by electricity, but it would appear that the electrical industry is not attempting to cater for the demand usually found.

Low-wattage storage tanks simply advertise the fact that we are not trying to cater for the demands usually supplied by coal or gas methods. Due to the scale from hard water considerable trouble is being experienced with coal and gas hot-water systems to such an extent that the cost of maintenance is proving prohibitive, the life of the component parts being too short. Electrical heating will meet with the same difficulties, taking into consideration that, comparatively speaking, electrical water heaters are a watchmaker's job compared with the robust apparatus found in coal and gas systems.

The only hope, I think, lies in the recognition of the following facts:—The hot water service must be equal to any demands, which fluctuate considerably over a period of time, and higher loaded water heaters are the only solution. If there are any objections to a higher loading, the same objections must be raised to other pieces of apparatus, namely, stoves, fires, wash boilers, &c. The construction of the hot water apparatus must be guaranteed for a long life, and the danger from scale, which is so injurious to the heating elements, will have to be effectively eliminated before there can possibly be any hope for electrical water heating.

A good many Corporation architects will not tackle the installation of a coal-heated system because of the trouble which they know will be experienced, and in some instances coal-heated systems are actually being taken out of the houses where they have been installed. Everyone, I think, is agreed that the method of heating water by means of the waste heat from the kitchen fire is the most economical that we can employ in this country, but the fact remains that even the working of this most economical method presents great difficulty in quite a large area in this country.

A great deal has been heard with regard to standardisation, with a view to cheap production, and, as the industry is yet in its infancy, it is essential that the supply authorities agree upon certain standards to enable the manufacturer to proceed on mass production lines. The result up to the present is chaos. Many authorities are carrying different parts as spares, and in the event of a replacement it is almost impossible, without considerable alteration, to fit one piece of apparatus in place of another. Many complaints are heard of the cost of the apparatus.

I suggest to the supply authorities concerned that if they would only agree upon the development of water heating and take their courage in both hands by determining to sell, say during the next 12 months, a certain number of water heaters they would then be able to receive prices for bulk purchases, which would enable the manufacturers to manufacture on lines similar to the gas people. When purchasing, the gas authorities do not talk in ones or twos but in grosses, and a few orders placed for the bulk supply of electrical water heaters would, I am sure, bring the prices to the level which the supply authorities, and the consumers in general, want.

Water Heater.

July 18th, 1930.

Handy Electrical Appliances.

Your reader " Backtogas " has had unfortunate- experiences—if he will get into touch with us we will tell him of concerns which can supply efficient apparatus for his " all-electric home."

Such goods as he mentions can be purchased at reasonable prices without any difficulty.

L. G. Hawkins & Company, Ltd.,

L. G. HAWKINS, *Managing Director.*

London, W.C.2, *July 19th*, 1930.

Kindly permit me to make a suggestion to " Backtogas," who appears to have an idea that it is necessary to " boil " an egg in order to cook it.

Boiling water from the electric kettle, to a depth of not more than ½ in., should be put into a pan large enough to hold the required number of eggs, a lid placed on the pan, which should then be put on the hotplate at " full " heat and in the usual time—3 to 3½ minutes—the eggs will be steam cooked.

A similar practice obtains in cooking vegetables. A small quantity of water, and steam cooking, not boiling. The best properties of the vegetables are then retained, not poured down the sink, as in the case of boiling.

C. H. Rayner.

Manchester, *July 19th*, 1930.

When I read your correspondent's letter under the non-de-plume of " Backtogas " I was amazed that anyone could have failed to find electrical appliances in these days that would not meet every requirement of an electrically wired house.

My company has for two years past sold a hollow immersion heater, which will bring half a pint of cold water to boiling point in approximately one minute. This little apparatus is also most suitable for boiling an egg, which can be rested on the top of the hollow ring.

If your correspondent cares to let me know the district in which he resides, I shall be only too pleased to give him the name of the nearest stockist.

I hope that other regular readers of your paper will also help your correspondent to keep gas out of his house, as it appears to me to be quite possible for this to be done for a few shillings, certainly without the expenditure of £7 10s. to which he refers.

C. D. Falcke,

HENDON LAMP & ACCESSORIES CO., LTD.

London, W.C.1, *July 21st*, 1930.

[This letter has been abbreviated.—EDS. ELEC. REV.]

With reference to the letter under the above heading signed " Backtogas " in the correspondence column of your issue of July 18th, I believe that the only appliance that will meet his requirements in every respect is the " Superspeed " boiling plate made by the Revo Electrical Co., Ltd., but it can only be used with alternating current and its first cost is high.

This boiling plate is very efficient, practically indestructible, and at least equal to the average gas ring as regards speed.

Borough Electrical Engineer.

July 21st, 1930.

Wireless and Distribution Change-overs.

I understand that a test case may shortly be made of the vexed question of wireless battery eliminators and electricity distribution system change-over.

It is recognised, I think, that these instruments are not commercially beneficial to the supply authority, the amount of current consumed being infinitesimal.

May I suggest that a fair way of treating the matter is to credit the *full* value of the d.c. eliminator in exchange for an a.c. eliminator which will be supplied by the supply authority at ordinary list price. The consumer then will not be at any disadvantage over any existing consumer of a.c., and will have had several years' use of his d.c. unit for nothing. If it is logical that an a.c. unit should be *given* in exchange for a d.c. unit (as is so freely suggested), surely it is just as logical that *any* supply authority which is already supplying a.c. should be made to give anyone who cares to buy a *d.c. unit* an a.c. unit in free exchange.

In most cases the change to a.c. is due solely to the Electricity Acts.

C. Culmer Hodges.

Dawlish, *July 17th*, 1930.

Contractors' Discounts.

Can contractor readers throw any light on the following position?

(1) A contractor supplies and fits up a plant and battery in the first instance.
(2) He continues to look after this plant from year to year.
(3 The plant and battery require renewal, and the purchase is made from a wholesaler.
(4) The wholesaler delivers the goods, and the contractor is called in to install it.
(5) Is the contractor entitled to any of the discount on the plant or battery?

Novice.

July 15th, 1930.

Labour Conditions Here and in France.

Adverting to the article on p. 1094 of your June 13th issue, it appears to me that the depreciation of the franc, as between 1911 and 1928, ought not be lost sight of when comparing the rates of wages paid in those years. In 1911 the franc was 5 times its 1928 value. Dividing this figure, 5, into the coefficient, 7.5, reduces the apparent rise in wages to merely 50 per cent

P. T. MacNamara.

New York, *July 11th*, 1930.

[While our correspondent's statement is perfectly correct, it was the aim of the "leaderette" in question to show that in France the "true" wages had risen, *i.e.*, that they had increased in greater proportion than the cost of living. The re-valorisation of the franc is therefore irrelevant to the issue. —EDS. ELEC. REV.]

The Shannon Scheme.

I am obliged to "P.T.W."

He has not answered my questions, but he has answered my purpose admirably.

Robert N. Tweedy.

Dublin, *July 16th*, 1930.

Published Specifications.

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.

1929.

2,404. "Vibration-recording apparatus." British Thomson-Houston Co., Ltd January 23rd, 1928. (304,672.)
2,794. "Tube-shaped armature for electrical sound boxes." Loewe-Radio Ges. January 27th, 1928. (305,031.)
8,179. "Electric remote-control apparatus." F. S. Hurst. May 14th, 1929. (331,228.)
8,677. "Coated metallic articles, particularly in electrical apparatus and machinery." J. Y. Johnson (I. G. Farbenindustrie Akt. Ges.). March 18th, 1929. (Cognate applications, 24,409/29 and 25,612/29.) (331,203.)
8,693. "Automatic telephone exchange systems." Standard Telephones and Cables, Ltd. (W. Hatton, C. de Vriendt, and E. J. Rousseau). March 18th, 1929. (331,204.)
9,057. "Dynamo-electric machines." A. B. Field and Associated Electrical Industries, Ltd. March 20th, 1929. (331,188.)
9,168. "Variable impedance devices." General Electric Co., Ltd., and A. E. Angold. March 21st, 1929. (331,234.)
9,432. "Radio signal receiving apparatus." H. Green and Celebritone, Ltd. March 23rd, 1929 (331,191.)
9,499. "Magnets." P. G. A. H. Voigt. March 25th, 1929. (331,209.)
9,523. "Manufacture of thermionic cathodes." Soc. Anon. des Etablissements Industries de E. C. Grammont et de A. Grammont. March 24th, 1928. (308,649.)
9,564. "Electric heating." F. A. L. Billerey. March 25th, 1929. (331,237.)
9,566. "Thermionic tubes." K. W. Daumann. March 25th, 1929. (331,250.)
9,601. "System for the transmission of signals with modulated carrier currents." Siemens & Halske Akt. Ges. May 9th, 1928. (311,318.)
9,730. "Electrical plug-and-socket connectors or couplings." F. E. Bancroft and Associated Electrical Industries, Ltd. March 26th, 1929. (331,251.)
9,743. "Arrangement for supplying current to radiophonic receivers." Constructions d'Appareillages et Specialités Electriques (C.A.S.E.). February 4th, 1929 (331,240.)
9,774. "Electric heat storage." G. Wilkinson. March 27th, 1929. (331,252.)
9,909. "Distributors for magneto-electric machines." British Thomson-Houston Co., Ltd., F. A. Fossey, and J. H. Pollard. March 27th, 1929. (331,257.)
9,976. "Selector switches, particularly for use in telephone systems." Standard Telephones and Cables, Ltd. (F. E. Schievens). March 28th, 1929. (331,272.)
9,977. "Measuring instruments, particularly for testing electro-magnetic devices." Standard Telephones and Cables, Ltd. (K. M. Sano). March 28th, 1929. (331,273.)
10,091. "Electric driving apparatus for talking machines." Dr. M. Levy Ges. March 30th, 1928. (308,842.)
10,337. "Magneto-electric machines." British Thomson-Houston Co., Ltd., and H. T. Warner. April 3rd, 1929. (331,232.)
11,086. "Junction boxes for electrical installations." E. P. S. Cattle. April 10th, 1929. (331,289.)
11,896. "Apparatus and process for the manufacture of lead-covered cables." Kabelfabrik Akt. Ges. February 7th, 1929. (331,301.)
12,115. "Control systems for power plant, comprising prime movers, electric generators, and motors driven thereby, and particularly for electric locomotives of this character." Associated Electrical Industries, Ltd. April 19th, 1928. (310,007.)
12,769. "Junction boxes for electric wiring systems." S. J. Bryce, W. R. Clements, H. Leicester, A. E. Watson, and J. H. Roberts. April 24th, 1929. (331,307.)
13,021. "Electric accumulators." I. G. Farbenindustrie Akt. Ges. May 12th, 1928. (311,401.)
13,998. Electric lighters for cigarettes or cigars." N. Allday. May 6th, 1929. (331,316.)
14,060. "Electric discharge tubes." S. G. S. Dicker (Naamlooze Vennootschap Philips' Gloeilampenfabricken). May 6th, 1929. (331,318.)
14,394. "Electrical induction furnaces." N. R. Davies and Associated Electrical Industries, Ltd. May 8th, 1929. (331,324.)
14,426. "Television receivers." Universal and General Radio Co., Ltd., and L. M. Myers. May 8th, 1929. (331,325.)
14,513. "Systems of electrical distribution." British Thomson-Houston Co., Ltd. May 9th, 1928. (311,344.)
14,671. "Advertising and like devices employing luminous discharge tubes." S. G. S. Dicker (Naamlooze Vennootschap Philips' Gloeilampenfabrieken). May 10th, 1929. (331,329.)
14,700. "Thermionic valve amplifier circuits." Westinghouse Electric and Manufacturing Co. May 17th, 1928. (311,817.)
15,720. "Screw sockets for connecting electric wires to walls and the like." G. Mehlhorn. May 21st, 1929 (331,334.)
16,187. "Telephone instruments." Celestion, Ltd., and C. French. May 25th, 1929. (331,336.)
16,425. "Magnetic motors." H. L. Worthington. May 28th, 1929. (331,340.)
17,381. "Alternating-current directional relays." T. W. Ross and Associated Electrical Industries, Ltd. June 6th, 1929. (331,352.)
17,663. "Illuminated signs." E. H. B. Cullen and Electronos, Ltd. June 8th, 1929. (331,358.)
18,622. "Suspension clamps for electric conductors." A. C. Goodwin and T. H. Barnard. June 17th, 1929. (331,368.)
18,776. "Frame aerials for wireless." E. N. Kent-Lemon. June 19th, 1929. (331,374.)
18,901. "Insulation of electric cables." A. E. Hughes and Liverpool Electric Cable Co., Ltd. June 19th, 1929. (331,376.)
19,438. "Electric testing device." J. F. Schleper. June 26th, 1928. (314,390.)
19,585. "Electric liquid heaters." British Brass Fittings, Ltd., W. P. Conly, and W. L. Dunn. June 26th, 1929. (331,383.)
19,838. "Arrangement for the repeated automatic reclosing of electric circuit breakers." Maschinenfabrik Oerlikon. July 5th, 1928. (314,954.)
20,440. "Electric circuit-control apparatus." J. E. Long. July 3rd, 1929 (331,310.)
21,338. "Electric commutators and similar devices." H. L. Duncan. July 11th, 1929 (331,396.)
21,619. "X-ray tubes." International General Electric Co., Inc. July 14th, 1928. (315,430.)
23,048. "Metal disk rectifiers for alternating electric currents." Associated Electrical Industries, Ltd August 22nd, 1928. (317,782.)
23,237. "Dry rectifiers." Süddeutsche Telefon-Apparate-Kabel-und Drahtwerke Akt. Ges. August 8th, 1928. (317,010.)
24,029. "Electron-discharge device." Raytheon, Inc August 15th, 1928. (317,398.)
25,155. "Control of alternating currents, especially those of high frequency." C. Lorenz Akt. Ges. September 4th, 1928. (Addition to 316,946.) (318,512.)
27,184. "Ceramic cores and like supports for the wires of electric heaters." Steatit-Magnesia Akt. Ges. December 3rd, 1928. (331,436.)
28,934. "Operating mechanism for electric circuit breakers." Allmänna Svenska Elektriska Aktiebolaget. September 26th, 1928. (319,694.)
29,288. "Metal-vapour rectifiers." Akt. Ges. Brown, Boveri et Cie. October 5th, 1928. (331,446.)
30,806. "Lead-sheathed electric cables." Siemens Schuckertwerke Akt. Ges. October 13th, 1928. (331,454.)
31,016. "Portable electrical fittings or hand lamps." R. A. Smith, H. G. Baggs, and J. A. Wilkins. October 12th, 1929. (331,455.)
32,855. "Thermionic valve amplifying systems." British Thomson-Houston Co., Ltd. November 20th, 1928. (331,462.)

Trade Mark Applications.

THE following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from the dates mentioned.

July 2nd.

Coronet. No. 512,601. Class 6. Electric dynamos, fans and motors.—Faudels, Ltd., 36-40, Newgate Street, E.C.1.

Cuprobrade, No. 512,034. Restauleed, No. 512,037. Terrakor, No. 512,038. Clyvalle, No. 512,039. Class 8. Electric cables.—Johnson & Phillips, Ltd., Victoria Road, Charlton, S.E.7.

Maestrophone. No. 507,306. Class 8. Radio-receiving sets, gramophones in combination with wireless receiving sets, &c.—J. H. Barlow, trading as Charles Homes, Halesowen, Birmingham.

Koorak. No. 512,006. Class 8. Philosophical and scientific instruments and apparatus for useful purposes.—Lissen, Ltd., Isleworth, Middlesex.

Wisemanette. No. 512,868. Class 8. Radio-telephonic apparatus.—Gas Light Fittings Co., Ltd., 322, Walworth Road, S.E.17.

July 9th.

CCA, New Poliflor (lettering and design). No. 513,108. Class 6. Electric floor polishing machines.—CCA (Vacuum Cleaners), Ltd., 324, Gray's Inn Road, W.C.1.

Micrometer & Lyre (design only). No. 508,331. Class 8. Apparatus for use in connection with radio-telephony and telegraphy.—Frederick Squire, Ltd., 10, Leswin Place, Stoke Newington, N.16.

Regentone. No. 512,220 Class 8. Radio-telephonic apparatus and parts thereof, sound-reproducing apparatus and parts, radio-telephonic apparatus in conjunction with gramophones, &c.—R. H. Nun, trading as the Regent Radio Supply Co., 21, Bartlett's Buildings, Holborn, E.C.4.

Texa. No. 513,225. Class 8. Radio-telephonic and telegraphic apparatus, electric batteries, dry cells, and accumulators, electric meters, induction coils, electric cables and flexibles, electric resistances and fitted electric switchboards. —Max Weinbaum, 419-423, Commercial Road, E.1.

Henlex. No. 513,387. Class 40. Wire covered with india-rubber.—W. T. Henley's Telegraph Works Co., Ltd., 11, Holborn Viaduct, E.C.1.

Barrier. No. 507,368. Class 50. Electric fuses and handles made of condensation products of phenol and formaldehyde or the like electrical insulating substances.—Castle Fuse Co., Ltd., 33, Chester Street, Liverpool.

July 16th.

Coronet. No. 512,602. Class 8. Radio-telephonic and telegraphic sets and parts thereof, electric accumulators, batteries and induction coils (not for medical purposes), electrical resistances and fitted electric switchboards.—Faudels, Ltd., 36-40, Newgate Street, E.C.1.

Philco (lettering and design). No. 513,549. Class 8. Apparatus for use in connection with telephony, telegraphy, and television.—Philadelphia Storage Battery Co., Philadelphia, U.S.A. (British representatives: J. Y. and G. A. Johnson, 47, Lincoln's Inn Fields, W.C.2.)

Duette. No. 512,869. Class 13. Electrical fusible cut-outs.—Midland Electric Manufacturing Co., Ltd., Barford Street, Birmingham.

Liver, No. 140,857, and L.E.C., Liverpool (lettering and design), No. 140,916. Class 25. Cotton sleeving for wire, cotton braids and tapes.—Liverpool Electric Cable Co., Ltd., Linacre Lane, Bootle, Lancs.

New Work for Contractors.

Particulars of new works and building schemes for the use of electrical installation contractors in search of work and all interested in the sale of electrical and allied plant and other products.

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

ASHTON-UNDER-LYNE.—Houses (180) for the T.C.; W. Chappell & Sons, builders, Swinton.

AYLESBURY.—Electricity showrooms, offices and stores for the T.C.; J. S. Quilter & Son, architects, 3, St. James's Street, London, S.W. (returnable deposit of £5 5s.).

BEBINGTON.—Houses (64), Mersey Bank estate; engineer and surveyor to Bebington and Bromborough U.D.C. (deposit £1 1s.).

BEXHILL-ON-SEA. — School for the borough E.C. (£12,000); director of education.

BILTON.—Houses (45) for T. E. Crowther, Rugby.

BOLTON.—Senior girls' school, Pilkington Street, for Rev. H. W. Leighton, M.C.; H. Greenbalgh, 15, Mawdsley Street, Bolton.

BRADFORD.—Elementary school, Swainestate, and infants' school, Eccleshill (£15,750); city architect.

BRAMHOPE (YORKS.).—Premises for National Children's Home and Orphanage; the governors.

CHESTERFIELD.—Municipal offices for the T.C.; borough surveyor.

CHIPPENHAM.—Houses (72) for the T.C.; A. E. Adams, borough surveyor (returnable deposit of £2 2s.).

CORNWALL.—Farm institute for the C.C. (£16,000); clerk to the Council, Truro.

CROYDON.—Houses (52) for the T.C.; J. C. Doyle, builder, Liverpool. Fire station, Woodside, for the T.C. (£11,000); borough surveyor.

DERBY.—Extensions, Hospital for Sick Children (£11,805); E. Wood & Sons, builders.

DUMFRIESSHIRE.—School, Moffat, for Dumfriesshire E.C.; director of education, Dumfries.

EASTBOURNE.—Houses (50) for the T.C.; borough surveyor. School and extensions for the borough E.C. (£33,583); director of education.

ESSEX.—Central school, Heathway, Becontree; county architect.

FIFESHIRE.—High school, Dunfermline, for Fifeshire E.C. (£100,000); director of education, Cupar.

GILLINGHAM (KENT).—Town hall for the T.C. (£100,000); borough surveyor.

GRAVESEND.—Cinema theatre, King Street, for Gravesend Gem Theatre Co., Ltd.; G. E. Clay, architect.

HALESOWEN.—Nurses' home, Cottage Hospital; A. T. Butler, architect.

HASTINGS.—Grammar school for the borough E.C. (£50,000); clerk.

HENLEY-IN-ARDEN.—Electric lighting installation, St. John's and St. Nicholas' churches; incumbent.

HONITON (DEVON).—Houses (30) for the T.C.; H. E. Robertson, architect.

HUDDERSFIELD.—Houses (102), Deighton, for the T.C.; borough architect.

HULL.—Three branch libraries for the T.C. (£25,000); city architect.

IRISH FREE STATE (DINGLE, CO. KERRY).—National school; Very Rev. Canon Brown, parish priest (deposit £1 1s.).

LIVERPOOL.—Reconstruction, Alhambra Cinema; L. A. G. Pritchard, architect.

LONDON (EAST HAM, E.).—Houses (30), Dersingham Avenue; Herapath Bros.

(HORTON, E.).—Nurses' home, mental hospital (£26,000); L.C.C. architect.

(ILFORD, E.).—King George Hospital (£85,000); T. G. Hawkins and Major H. M. Keen, builders.

(E.C.).—Improvements, Guildhall and Central Criminal Court (£11,000); city engineer.

(ST. PANCRAS, N.W.).—Offices for Manchester Unity of Oddfellows, Warren Street; C. E. Blackbourn, architect.

LONDON (*continued*).

(ELTHAM, S.E.).—Houses (75), Cambridge estate; W. R. Hindmarsh & Co. Houses (110), Sidcup Road and Green Lane; Eley & Allen.

(GREENWICH, S.E.).—Cinema, Plumstead High Street and Wickham Lane; W. R. Hindmarsh & Co.

(HONOR OAK, S.E.).—Houses (70), Bexhill and Salehurst Roads, Crofton Park; G. T. Harman.

(KENSINGTON, S.W.).—Block of flats, Pelham Street; R. M. Piggott, architect.

(TOOTING, S.W.).—Cinema; G. Parker & Sons, Ltd., contractors, 124, Summer Road, S.E.

(BATTERSEA, S.W.).—Boiler house, Nine Elms baths (£11,000); borough engineer.

(EALING, W.).—Factory for Aladdin Industries, Ltd., Western Avenue; Nicholas & Dixon-Spain, architects.

(HOLBORN, W.C.).—Shops and flats, Theobald's Road; Robert Angell & Curtis, architects.

MALLING (KENT).—Electric lighting and heating installations, East Malling isolation hospital, for the R.D.C.; S. L. Bundy, surveyor.

MANCHESTER.—Public baths, Broadway, New Moston; city architect, Town Hall.

NANTWICH.—Houses (70) for the R.D.C.; H. Crabtree, surveyor.

NOTTINGHAM.—Houses (350); city engineer.

OAKENGATES (SALOP.).—Houses (60) for the U.D.C.; surveyor (returnable deposit of £2 2s.).

OTLEY.—Ice rink and alterations to Queen's Theatre; Bentley & Rawnsley.

OULTON.—Mental colony (£225,000); West Riding C.C.

OXFORD.—Senior school (240), Cowley, for E.C. Construction of Shotover reservoir (£16,201); William Wilson and Co. (Newcastle), Ltd.

PORTSMOUTH.—Additions, Southern secondary school (£10,000) for the E.C.

PRESTWICH.—Junior and infants' school, Thorndyke Walk; S. Wilkinson, architect, 16, Ribblesdale Place, Preston. (Deposit £2 2s.).

RETFORD.—Sewage pumping plant; surveyor to the Council.

ROCHFORD.—Cottages (40), Aerodrome estate; Charles Taylor.

ROWLEY REGIS.—Houses (268) for the U.D.C.; surveyor.

RUGELEY (STAFFS.).—Houses (60) for the U.D.C.; surveyor.

SCOTTON.—Sanatorium for women (£220,000) for the West Riding C.C.

SOUTH HAYLING.—Remodelling St. Andrew's Home School (£11,000); Portsmouth city engineer.

STAFFS.—Schools, Short Heath, Fazeley, Rushbury, Upper Penn, and Pelsall, for the E.C.; education architect, Stafford.

STOCKPORT.—Cinema, Mersey Square; W. Thornley, architect, 46, Wallgate, Wigan.

SUTTON (SURREY).—Houses (80), Cheam; J. R. R. Oddy. Houses (35), Worcester Park; Shuttleworths, Ltd.

SWANSEA.—College buildings, Singleton; trustees, University College of Swansea.

THORNE (YORKS.).—Houses (100), Stainforth, for the R.D.C.; H. Plewes, surveyor (returnable deposit of £2 2s.).

WALSALL.—Houses (118), Maw Green site; Sabin and Young, Ltd., builders, Doncaster. Swimming baths (£50,000); borough surveyor.

WARRINGTON.—Houses (174) for the T.C.; borough engineer (returnable deposit of £2 2s.).

WEST RIDING.—Schools, Rothwell (£63,000), Sharleston (£28,000), and Royston (£38,000), for the West Riding E.C.; H. Wormald, architect, County Hall, Wakefield.

WOLVERHAMPTON.—Baths, Tudor Road (£36,000); borough engineer.